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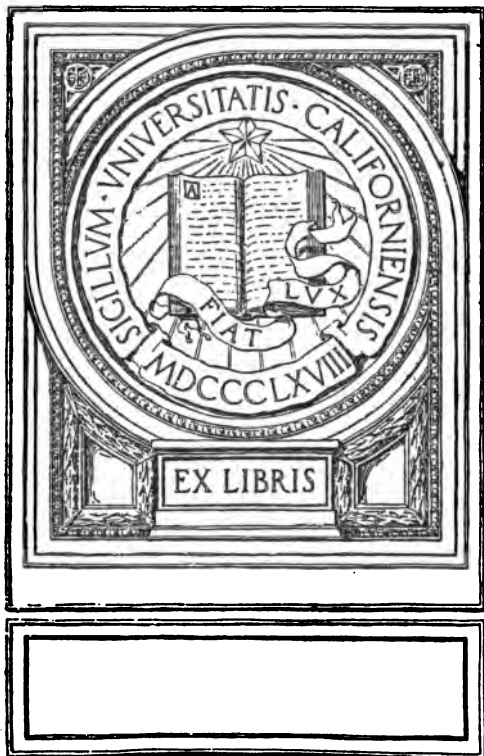
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PISTOL AND
REVOLVER

HIMMELWRIGHT

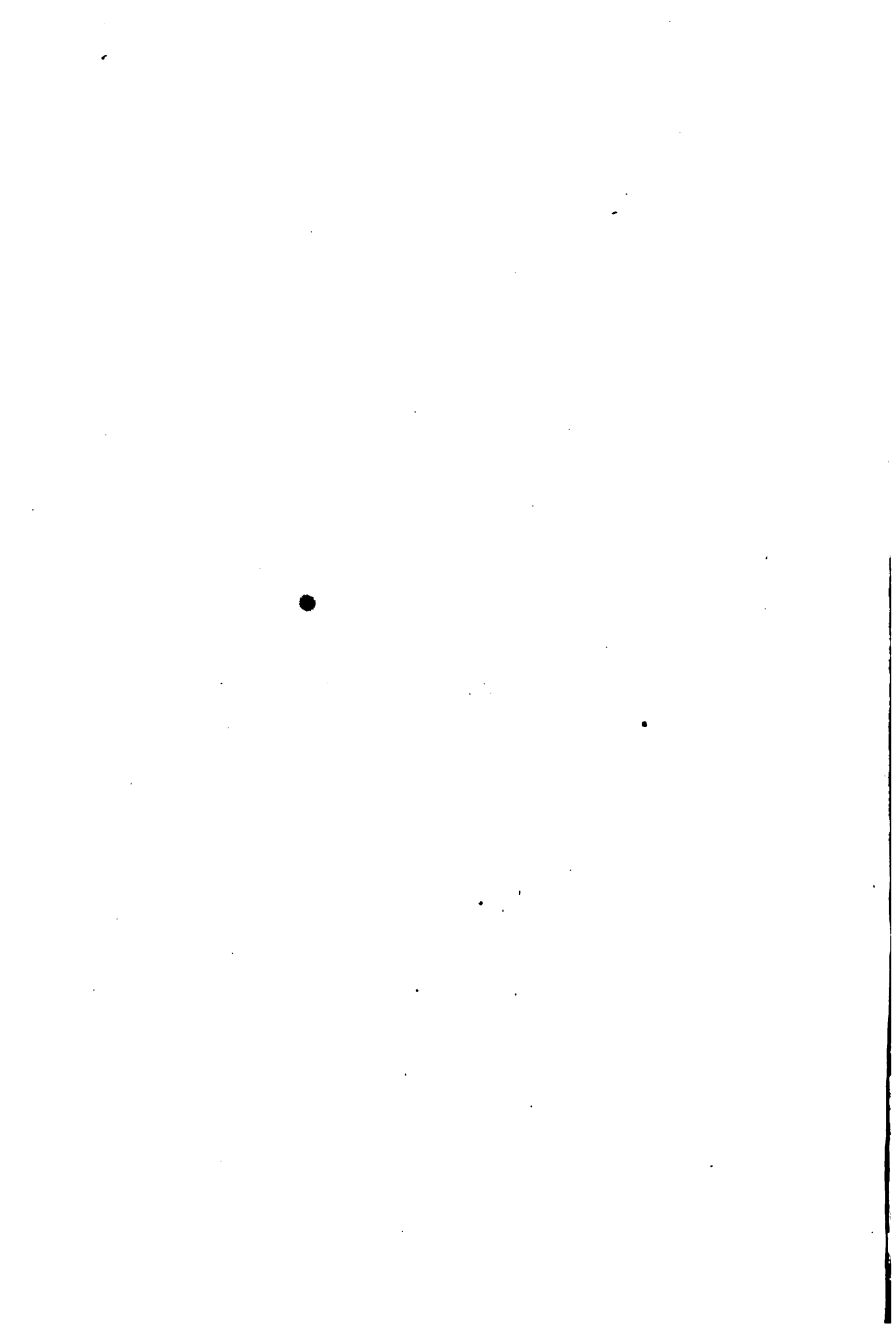
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THE Pistol and Revolver

By

A. L. A. HIMMELWRIGHT

President, United States Revolver Association; Director and Life Member, New York State Rifle Association; Captain, American Team, Second Franco-American International Revolver Match; Chairman, Revolver Committee, Manhattan Rifle and Revolver Association, etc.

ILLUSTRATED



NEW YORK

PRINTED BY

J. J. LITTLE & CO.

1908

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DEDICATED
TO THE MEMORY OF
ARTHUR CORBIN GOULD

921578

“ Every right-minded and patriotic citizen of the United States should be a good marksman. It is a duty he owes to his country under her present liberal institutions, which do not exact military service, but presume reliance in a large measure on citizen soldiery in case of war.”

PREFACE

Interest in pistol and revolver shooting has increased very rapidly in recent years and particularly since smokeless powder has been introduced.

The revolver and the magazine pistol now constitute part of the regular equipment of army and navy officers and cavalry troops. Regulations governing practice shooting with these arms have been issued and adopted by both branches of the service and by the National Guard of the various States. In the National Rifle Association and in the various State Rifle Associations that have recently been organized, pistol and revolver shooting has an important place, and the matches provided are largely patronized. In the numerous civilian shooting clubs scattered throughout the country pistol and revolver shooting has become extremely popular, and in many cases the majority of the members practice more frequently with the smaller arms than with the rifle.

Practice with the pistol and revolver affords training in sighting, steady holding and pulling

the trigger, which are the essential features of rifle shooting also. On account of this relation, and the fact that skill with these arms can be instantly utilized in rifle shooting, the development of marksmanship with the pistol and revolver properly assumes national importance.

While numerous standard works have been written on the subject of rifle shooting, there is comparatively little information available on pistol and revolver shooting. The object of this volume is to supply practical information on this subject. The author has attempted to treat the subject in a clear and concise manner, keeping the size of the volume as small as practicable and so as to be conveniently carried in the pocket. Particular pains have been taken to give sound advice and elementary instruction to beginners.

The author extends his grateful acknowledgments to Messrs. J. B. Crabtree, John T. Humphrey, William E. Carlin, Chas. S. Axtell, Walter Winans, Walter G. Hudson, Ed. Taylor, J. E. Silliman, M. Hays, Baron Speck von Sternburg, and the various arms and ammunition manufacturers referred to herein, for valuable suggestions, information and *data* in preparing this volume.

A. L. A. HIMMELWRIGHT.

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THE PISTOL AND REVOLVER

PISTOL-SHOOTING as a pastime has been practised since the time of the discovery of gunpowder. It is only recently, however, that it has been recognized as a legitimate sport.

The useful and practical qualities of the pistol and revolver have been developed almost wholly during the last half-century. Before this period the small arms designed to be fired with one hand were crude and inaccurate, and were intended to be used only at short range as weapons of defence. The single-barrelled muzzle-loading pistol has, nevertheless, been part of the army and navy officer's equipment since the sixteenth century. These pistols were of large caliber, smooth-bored, heavy, and unwieldy. The load was a spherical bullet and a large charge of powder. Enough accuracy was obtained to hit a man at 15 to 20 paces, which was deemed sufficient. The usefulness of these arms in action was limited to the firing of a single shot, and then using them

as missiles or clubs. The pistol in early days was considered a gentleman's arm — a luxury. It was the arm generally selected for duelling when that code was in vogue, the contestants standing 10 to 20 paces apart and firing at the word of command.

The development of the pistol has been contemporaneous and closely identified with that of the rifle. With the grooving or rifling of the barrel, the accuracy was greatly improved and the arm adapted to conical bullets. Although numerous attempts were made to devise a multi-shot arm with flint, wheel, and match locks, it was not until the percussion cap was invented that a practicable arm of this character was produced. This was a "revolver" invented by Colonel Colt of Hartford, Conn., and consisted of a single barrel with a revolving cylinder at the breech containing the charges, the mechanism being such that the cocking of the piece after each discharge revolved the cylinder sufficiently to bring a loaded chamber in line with the barrel. The greatest advance in the development of firearms was the introduction of the system of breech-loading, employing ammunition in the form of cartridges. This principle rendered the operation of loading much simpler

and quicker, and vastly improved the efficiency and general utility of the arms.¹

The present popularity of pistol and revolver shooting is due, no doubt, to recent improvements in the arms and ammunition. The arms are now marvels of fine workmanship, easy to manipulate, durable, and extremely accurate. With the introduction of smokeless powders, the smoke, fouling, and noise have been reduced to a minimum. The effect of these improvements has been, not only to increase the efficiency of the arms, but also the pleasure of shooting them.

As a sport, pistol shooting has much to commend it. It is a healthful exercise, being practised out-of-doors in the open air. There are no undesirable concomitants, such as gambling, coarseness, and rough and dangerous play. In order to excel, regular and temperate habits of life must be formed and maintained. It renders the senses more alert and trains them to act in unison and in

¹ For a detailed history of the evolution of the pistol and revolver, the reader is referred to "Text-book for Officers at Schools of Musketry," Longman & Co., London; "Kriegstechnische Zeitschrift," Heft I and II, 1901, Mittler & Sohn, Berlin; "The Modern American Pistol and Revolver," Bradlee Whidden, Boston. Many interesting specimens of ancient and modern pistols and revolvers are owned and exhibited by the United States Cartridge Company of Lowell, Mass.

harmony. But, above all, skill in shooting is a useful accomplishment.

Any one possessing ordinary health and good sight may, by practice, become a good pistol shot. Persons who are richly endowed by nature with those physical qualities which specially fit them for expert shooting, will, of course, master the art sooner than those less favored; but it has been conclusively shown that excellence is more a question of training and practice than of natural gift. Some of the most brilliant shooting has been done by persons possessing a decidedly nervous temperament; but those of phlegmatic temperament will generally make more uniform and reliable marksmen.

It is much more difficult to shoot well with the pistol or revolver than with the rifle. The latter, having a stock to rest against the shoulder and steady one end of the piece, has a decided advantage in quick aiming and in pulling the trigger. The former, without a stock and being held in one hand with the arm extended so as to be free from the body, is without any anchor or support whatever, and is free to move in all directions. Consequently the least jar, jerk in pulling the trigger, puff of wind, or unsteadiness of the hand greatly

disturbs the aim. Intelligent practice will, however, overcome these difficulties and disadvantages to such a degree that an expert shot with a pistol or revolver under favorable conditions can equal a fair shot with a rifle at the target up to 200 yd. When the novice essays to shoot the pistol or revolver, the results are generally disappointing and discouraging; but rapid progress invariably rewards the efforts of those who persevere, and when once thoroughly interested in this style of shooting, there comes a fascination for it that frequently endures throughout a lifetime.

ARMS

The term "pistol" is frequently applied indiscriminately to the single-shot pistol and the revolver. A marked distinction between these arms has gradually been developed. The pistol is now recognized as a single-shot arm, adapted for a light charge, and designed to secure extreme accuracy. Its use is limited almost exclusively to target and exhibition shooting.

The modern revolver is an arm with a revolving cylinder holding five or six cartridges, which are at the instant command of the shooter before it is necessary to reload. It is designed

for heavy charges, and is a practical and formidable weapon. Revolvers are made in great variety, and adapted for various purposes, such as military service, target shooting, pocket weapons, etc. The best grades of pistols and revolvers may be had at a reasonable price. The cheap grades with which the market is at all times flooded should be avoided. They are incapable of doing good work, and frequently are positively dangerous, on account of being made of inferior materials.

Military Arms.—The revolver and the magazine pistol are used for military service. To fulfil the requirements these arms must be strong, very durable, and withstand a great amount of hard usage without becoming disabled. The effectiveness, or “stopping power,” is of prime importance. The caliber should be large, and the charge sufficiently powerful to give a penetration of at least 6 in. in pine. There has been a tendency in recent years to reduce the caliber of military revolvers. While this has resulted in increased velocity and penetration, and reduced the weight of the ammunition, it has not improved the stopping power of the arms.

The sights must in all cases be very substan-

tial, and solidly fixed to the frame or barrel. The trigger pull varies from 4 to 8 lb., the barrel from 4 to $7\frac{1}{2}$ in. in length, and the weight from 2 to $2\frac{3}{4}$ lb. Ammunition loaded with smokeless powder is now invariably used for military service.

The service revolvers as issued to the United States army and navy are the Smith & Wesson and Colt, both .38 cal., and taking the same ammunition. They have passed the prescribed series of tests as established by the United States government,¹ and represent, without doubt, the highest development of the military revolver.

The arms shown in Figs. 1 and 2 have solid frames, and the actions are almost identical, the cylinder swinging out to the left, on a hinge, when released by a catch. The shells may then be extracted simultaneously by pushing back the extractor rod. The Smith & Wesson has an additional locking device in front of the cylinder. The principal difference between these arms is in the shape of the handles.

Other excellent military revolvers are the Smith & Wesson Russian Model and the Colt

¹ See Ordnance Reports, Department of War, Washington, D. C., for complete details of tests, etc.

New Service, both .44 cal. The ammunition for these arms was formerly loaded with black powder; but smokeless cartridges have been adapted to them, which give slightly increased velocity and approximately the same accuracy.

The Smith & Wesson Russian Model has a hinge "tip-up" action, with an automatic ejecting device. The action is operated by raising a catch in front of the hammer. It is easy to manipulate, and, on account of the accessibility of the breech, the barrel can be readily inspected and cleaned. This arm is single action.

The action of the Colt New Service is similar to that of the .38-cal. revolver, shown in Fig. 2, with a solid frame. It is double action.

The foregoing arms, with good ammunition, are capable of making groups of ten shots on a 3-in. circle at 50 yd.

The Colt Frontier Model is one of the most popular arms for hard service. It has a solid frame and is double action. The arm is operated by opening a gate on the right-hand side, back of the cylinder. The cartridges are inserted in the cylinder through the gate, the cylinder being revolved by hand until the respective chambers come opposite the gate. In the same manner,



FIG. 1. — Smith & Wesson New Military Revolver.
Six shots; $6\frac{1}{2}$ -inch barrel; weight, 1 lb., 15 oz.; .38 cal.



FIG. 2. — Colt New Army Revolver.
Six shots; 6-inch barrel; weight, 2 lb.; .38 cal.



FIG. 3. — Smith & Wesson Russian Model Revolver.
Six shots; $6\frac{1}{2}$ -inch barrel; weight, $39\frac{1}{4}$ oz.; .44 cal.

the shells are ejected by pushing the extractor rod back into each of the chambers.

This revolver in .45 cal. was formerly the service weapon of the United States army, and is very powerful and durable.

The Smith & Wesson Schofield Model, .45 cal., was also formerly a United States service weapon. The ammunition for this arm, while less powerful than the .45 Colt, was admirably adapted for military service, and had much less recoil.

The Webley, "W.G." or "Army Model," revolver is an English arm of much merit. The calibre is .455. It has a hinge "tip-up" action, with an automatic extractor very similar to the Smith & Wesson.

The service weapon adopted by the Joint War Office and Admiralty Committee for the British army and navy is the "Webley Mark IV," or "Service Model," revolver. This model is almost identical with the Army Model, except that the barrel is 4 in. long and the weight is 2 lb. 3 oz. On account of the short barrel, the accuracy of this weapon does not equal that of the Army Model.

Another English arm is the "Webley-Fosbury" automatic revolver. The recoil revolving the cylinder and cocking the hammer, it can be fired



FIG. 4. — Colt New Service Revolver.

Six shots; $5\frac{1}{2}$ -inch barrel; weight, 2 lb., 8 oz.; .45 cal.



FIG. 5. — Colt Frontier Model Revolver.

Six shots; $5\frac{1}{2}$ -inch barrel; weight, 2 lb., 5 oz.; .45 cal.



FIG. 6. — Webley "W. G." Army Model Revolver.

Six shots; 6-inch barrel; weight, 2 lb., 8 oz.; .455 cal.

as rapidly as the automatic pistols. It is chambered for the .455 service cartridge loaded with $6\frac{1}{4}$ gr. of cordite. This arm has been introduced since 1900.

The magazine or automatic pistol, which is operated by the recoil, is the latest type of hand firearm. It has been perfected and introduced since 1899, and has almost double the velocity and range of the revolver. The Colt, Luger, Mauser, Mannlicher, and Mors are among the leading makes of this style of pistol. All of these arms have been tested by the United States government.¹ A limited number of the first two named have been used since 1903 in the United States army.

In both the Colt and the Luger pistols the cartridges are inserted in clips and fed into the breech through the handle. In the Mauser pistol the cartridges are supplied in clips from the top and forced into a magazine located in front of the trigger.

The magazine pistols can be fired at the rate of about five shots per second. These arms equal the best military revolvers in accuracy.

¹ See Ordnance Reports, Department of War, Washington, D.C., for complete details of tests, etc.



FIG. 7. — Webley-Fosbury Automatic Revolver.
Six shots; 6-inch barrel; weight, 2 lb., 8½ oz.; .455 cal.



FIG. 8. — Colt Automatic Pistol.
Seven shots; 6-inch barrel; weight, 2 lb., 5 oz.; .38 cal.



FIG. 9. — The Parabellum or "Luger" Automatic Pistol.
Eight shots; 4½-inch barrel; weight, 1 lb., 13.4 oz.; .30 cal.

Many persons believe that the magazine pistol will soon supersede the revolver for general use. While this may be the case eventually, it is not likely to occur within the next few years. The magazine pistol is more complicated, and consequently more difficult to learn to shoot with and care for, than the revolver. On account of the special problems to be solved in the mechanism, many of them balance poorly and the trigger pull is almost invariably long and creeping. The novice will also find it difficult to avoid flinching in shooting these arms, on account of the recoil mechanism, louder report, etc. The line of sight being considerably higher than the grip, if they are not held perfectly plumb, or in the same position at each shot, the shooting is liable to be irregular. The cost is about double that of a good revolver. Until these undesirable features and disadvantages can be remedied or eliminated, the revolver will probably remain a popular arm.

Target Arms.—For target purposes the greatest possible accuracy is desirable. To obtain this, many features essential in a military arm are sacrificed. Delicate adjustable sights are employed, the trigger pull is reduced, the length of the barrel is increased, the charge reduced, etc.

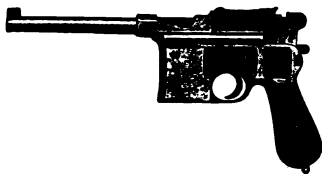


FIG. 10. — Mauser Automatic Pistol.

Ten shots; $5\frac{1}{2}$ -inch barrel; weight, 2 lb., $7\frac{1}{2}$ oz.; .30 cal.



FIG. 11. — Smith & Wesson Pistol.

10-inch barrel; weight, 1 lb., $8\frac{3}{4}$ oz.; .22 cal.



FIG. 12. — Stevens Pistol, Gould Model.

10-inch barrel; weight, 1 lb., 12 oz.; .22 cal.

The most accurate arms available at the present time are the single-shot pistols manufactured by Smith & Wesson, Springfield, Mass.; The J. Stevens Arms & Tool Co., Chicopee Falls, Mass.; The Remington Arms Co., Ilion, N.Y.; and William Wurfflein, Philadelphia, Pa. These pistols are furnished in calibers from .22 rim-fire to .38 central-fire. The barrels are generally 10 in. in length and the trigger pull 2 lb. In the latest approved form these pistols are of .22 cal., specially bored and chambered for the rim-fire, long rifle cartridge. This is a light, clean, pleasant shooting charge, and may be fired many times with very little fatigue. Pistol shooting with arms of this caliber should, therefore, become a popular pastime for ladies as well as gentlemen.

The Smith & Wesson pistol has a tip-up action and an automatic extractor. It is made of the best materials and with the greatest care. The fitting and workmanship are superior to that of any other machine-made pistol. The action is similar to that of the Russian Model revolver.

The Stevens pistols are furnished in two other models for target-shooting. The "Lord" Model has a large frame and handle and a heavy barrel. Its weight is $2\frac{3}{4}$ lb. The "Conlin" Model



FIG. 13. — Wurfflein Pistol.
10-inch barrel; weight, 2 lb., 2 oz.; .22 cal.



FIG. 14. — Remington Pistol.
10-inch barrel; weight, 2 lb., 8 oz.; .44 cal.



FIG. 15. — Gastinne-Renette Pistol.
10 $\frac{1}{8}$ -inch barrel; weight, 2 lb., 6 oz.; .44 cal.

is the same as the "Gould" Model, but has a spur added to the trigger guard. The Gould Model is the most popular. All these models have a tip-up action and an automatic extractor. A small knob on the left side is pressed to release the barrel and operate the action.

The Wurfflein pistol, like the Stevens, has a tip-up action. It is well made and has a handle very similar in shape to that of the duelling pistol of former days. The action is operated by releasing the catch on the handle, back of the hammer.

The Remington pistol has an exceedingly strong action, and is the only pistol that can be had chambered for the .44 Russian cartridge. It has a large handle and a heavy barrel. The action is operated when the hammer is at full-cock by throwing back the breech-block with the thumb, simultaneously ejecting the empty shell.

With good ammunition all these pistols are capable of placing ten shots within a 2-in. circle at 50 yd.

A very accurate pistol for gallery and short-range shooting is made by M. Gastinne-Renette of Paris and used in his gallery in that city. These are muzzle-loading and very tedious and inconvenient to manipulate. For this reason

they have not become popular. A few of these arms have been made up as breech-loaders, with a tip-up action similar to the Stevens, and chambered for the .44 Russian cartridge. In this form the pistol has given very good results.

The revolver is not quite as accurate as the pistol, on account of the necessity of having the cylinder detached from the barrel. If the pin on which the cylinder revolves is not at right angles with the end of the cylinder, there will be more space between the cylinder and the breech end of the barrel in some positions of the cylinder than in others. The result will be varying amounts of gas escaping from the different chambers of the cylinder, and consequently irregular shooting. The accuracy of the revolver depends largely upon the degree of perfection in which all the chambers of the cylinder align with the bore of the barrel at the instant of discharge. When the chambers do not align perfectly, the bullet enters the barrel eccentrically and a portion of it is shaved off. This is fatal to accuracy, especially when smokeless powder is used. Imperfect alignment of chamber and barrel is also the most frequent cause of the "leading" of the barrel. Some very ingenious mechanical expedients are used in

the best revolvers to reduce to a minimum the wear of those parts which operate and hold the cylinder in position.

The revolvers generally used for target shooting are the military arms already described, chambered for special cartridges, fitted with target sights, special handles, and other modifications to suit the whims and tastes of individuals. The best and most experienced shots are, however, careful to keep the modifications of all their arms within the rules and regulations of the various national organizations,¹ in order that they may be used in the annual competitions and other important events. These organizations control pistol and revolver shooting, and conduct annual competitions. "Freak" arms which do not comply with the rules are not allowed in the competitions, are seldom practical, and have little or no value other than for experimental purposes. Target arms are generally used for trick and exhibition shooting.²

¹ The United States Revolver Association, The National Rifle Association of Great Britain, and the United Shooting Societies of France. For programmes and details, address the secretaries of the respective organizations.

² For descriptions and illustrations of this style of shooting, see "The Art of Revolver Shooting," G. P. Putnam's Sons, New York and London. This elaborate work contains also much detailed information, valuable sug-

Pocket Arms. — The most extensive use of the revolver as a pocket weapon is for police service. Special arms are manufactured to meet the requirements. These weapons are generally similar to the military revolvers, but adapted for lighter charges, and consequently weigh less. All projections, such as sights, hammer, etc., must be eliminated or minimized so as not to catch in drawing the arm from the pocket or holster. The barrels are from 3 to 5 in. in length, the trigger pull 4 lb., and the caliber usually .32 or .38. Of these two calibers, .38 is much preferable for the general purposes of an arm of this character. The difference in weight is slight, while the power and effectiveness of the larger caliber is almost double that of the smaller.

The pocket arms shown in Figs. 16 and 17 are practically miniatures of the military arms shown in Figs. 1 and 2. They have solid frames and actions identical with those of the military arms. They are made only in .32 cal., and are double action.

One of the most recent pocket revolvers is the Smith & Wesson Safety Hammerless. This arm

gestions, and many interesting personal experiences in relation to revolver shooting.

has a safety clutch in the back of the handle, so designed that unless the piece is properly held it is impossible to operate it. It has many valuable and desirable features to commend it as a practical pocket weapon. The standard length of barrel is 4 in. This arm is also furnished in .32 cal.

With 4-in. barrels, the foregoing pocket weapons are capable of shooting regularly within a 2-in. circle at 12 yd.

A heavier and correspondingly more powerful pocket revolver is the Colt "Double Action" revolver. This arm is chambered for the Colt .41 cal. short and long cartridges. It has a solid frame, and is operated exactly like the Colt Frontier Model (Fig. 5). It is compact, strong, durable, and accurate.

The "Single Action Army" is another Colt revolver that has been extensively used as a belt or holster weapon. The mechanism and action are similar to that of the preceding arm, except that it is heavier and larger, and is single action.

A very handy little arm to carry in the pocket on hunting and fishing trips is the Stevens Diamond Model single-shot pistol. This pistol is very accurate, and can be depended on to kill grouse, ducks, rabbits, and other small game. The



FIG. 16. — Colt New Police
Revolver.

Six shots; 4-inch barrel; weight,
18 oz.; .32 cal.



FIG. 17. — Smith & Wesson Pocket
Revolver.

Six shots; 4½-inch barrel; weight,
18½ oz.; .32 cal.



FIG. 18.—Smith & Wesson Safety
Hammerless Revolver.

Five shots; 4-inch barrel; weight,
1 lb., 1¼ oz.; .38 cal.



FIG. 18A.—Smith & Wesson Pocket
Revolver.

Seven shots; 3½-inch barrel; weight,
10 oz.; .22 cal.



FIG. 19. — Stevens Diamond Model Pistol.

6-inch barrel; weight, 8¾ oz.; .22 cal.

.22-cal., short, hollow-pointed bullet should be used, or the regular .22 short cartridge, with the front of the bullet cut off square, so as to leave a flat point. This will increase the killing effect of the bullet considerably.

AMMUNITION

The degree of perfection that has been attained in the manufacture of ammunition is remarkable. Generally speaking, the smaller the charge the more difficult it is to make it accurate. Notwithstanding this, we have in the .22-cal. ammunition a tiny cartridge the accuracy of which falls little short of the marvellous. Until very recently, black powder ammunition was used almost exclusively for pistol and revolver shooting. In calibers larger than .22, smokeless powders are now extensively used, especially in military shooting, where the regulation full charge is required. In the .22-cal. pistols, the fouling of the black powders is not a very serious matter, and it is not uncommon to shoot fifty or a hundred rounds without the necessity of cleaning. In the larger calibers, however, the fouling is frequently so excessive that it affects the accuracy after the tenth shot. The incessant cleaning that is necessary in order to get good

results with black powder ammunition was a great drawback, and detracted much from the pleasure of revolver shooting. Fortunately this objection is now entirely eliminated by the use of smokeless powders.

To give good results, the proportions of any given charge must be adapted to the caliber, length of barrel, and weight of the arm in which it is to be used. These proportions are generally determined by experiment. The accuracy of the cartridge depends largely upon the uniformity exercised in the loading. In ammunition for military service the shells are crimped on the bullets to hold them in place. This is not desirable in black powder target ammunition, but is necessary in all smokeless ammunition to confine the powder and produce uniform results.

In the following detailed description of the cartridges in general use the weight of the *black powder* charges only are given.

Rim-fire Cartridges.—These contain fulminate of mercury for priming around the outer edge of the rim, or base of the shell, and are generally loaded with black powder.

The “.22-cal. long rifle” cartridge is more extensively used for pistol shooting than any

other. It is the most accurate of the .22-cal. cartridges, being well proportioned, the bullet well lubricated, and the shell uncrimped.

In addition to this, the ammunition is inexpensive and has very clean shooting qualities. It is, therefore, particularly well adapted for pistol



FIG. 20. — Powder, 5 gr.; bullet, 40 gr.; exact cal., 0.223.



FIG. 21. — Powder, 3 gr.; bullet, 30 gr.; exact cal., 0.223.

shooting. This cartridge, fired from a 10-in. barrel, will shoot regularly inside of a 2-in. circle, at 50 yd., and inside a 5-in. circle, at 100 yd.

Another excellent cartridge in this caliber is the ".22 short." Like the preceding, this cartridge fouls very little and gives almost equal accuracy up to 50 yd. On account of its lighter report it is preferred by many for gallery shooting. In both of these cartridges only the surface of the bullet outside of the shell is lubricated. Exposed in this way, the lubricant is easily rubbed off, or melted if allowed to stand in the sunlight on a warm day. Great care should be taken to prevent this, as, without lubrication, the bullets will lead the barrel and cause inaccurate shooting.

The .22-cal. Winchester is a cartridge with inside lubrication. It is more powerful than the .22 long rifle, and gives good results in the pistol. The bullet has a flat point, making it suitable for game shooting, and the lubrication being within the shell, these cartridges may be carried loose in the pocket.



FIG. 22. — Powder, 7 gr.; bullet, 45 gr.; exact cal., 0.223.

All the .22-cal. cartridges can be had with hollow-pointed bullets, which are to be preferred for game-shooting. They are also furnished loaded with smokeless powder. When this powder was first used in .22-cal. ammunition, the results were far from satisfactory, but as now manufactured the smokeless ammunition approximates very closely in uniformity and accuracy to that loaded with black powder. The .22-cal. Long Rifle "Armory" and the .22-cal. Smith & Wesson Long are special makes of the long rifle cartridge that are furnished with a crimped shell, preventing the bullet from becoming dislodged and thus adapting this popular cartridge for use in revolvers of this calibre.

The .25-cal. Stevens is a much more powerful cartridge than any of the preceding, and gives

excellent results in the pistol. It is selected by those who wish a more powerful rim-fire cartridge than is furnished in .22 cal.

Rim-fire cartridges in larger caliber than .25 are used for derringers (large-bore, single-shot pocket-pistols now seldom used) and inferior grades of revolvers. These cartridges sometimes lack uniformity in caliber when



FIG. 23. — Powder, 11 gr.; bullet, 67 gr.; exact cal., 0.257.

made by different manufacturers, are frequently defective, and discharge occasionally in closing the action of the arm in which they are loaded. They consequently lack the safety, reliability, and accuracy of the corresponding calibers in central-fire ammunition. Rim-fire cartridges cannot be reloaded.

Central-fire Cartridges.— This type of cartridge has a brass or copper primer charged with a small quantity of fulminate of mercury, and containing a skeleton anvil of brass. The primer fits water-tight in a socket in the centre of the base of the shell. After being discharged, the primer can be renewed and the shell reloaded. In all the central-fire cartridges the lubrication of the bullet is inside of the shell, rendering this ammuni-

tion much more serviceable and less liable to be damaged.

The .32-cal. S. & W. cartridge is adapted to the Smith & Wesson, Colt, or other pocket revolvers.



FIG. 24. — Powder, 10 gr.; bullet, 88 gr.; exact cal., 0.313.



FIG. 25. — Powder, 13 gr.; bullet, 100 gr.; exact cal., 0.313.

Occasionally single-shot pistols are chambered for this cartridge. It is fairly accurate at ranges up to 50 yd. A gallery charge is furnished in this shell consisting of 4 gr. of powder and a spherical or "round" bullet weighing 47 gr.

The .32-cal. S. & W. Long is more accurate and powerful than the preceding cartridge. It gives excellent results in both the pistol and revolver. The gallery charge is the same as that of the .32 S. & W.

The .32-cal. Colt New Police is also an accurate cartridge, and was designed specially for the Colt New Police revolver. A gallery charge is furnished in this shell consisting of a powder charge reduced to 7 gr. and the regular bullet.



FIG. 26. — Powder, 13 gr.; bullet, 100 gr.; exact cal., 0.313

The .32-44 S. & W. is a special target cartridge designed for the S. & W. Russian Model revolver. The bullet is seated inside of the shell, which is straight and uncrimped. The revolver may be



FIG. 27. — Powder, 11 gr.; bullet, 83 gr.; exact cal., 0.323.



Powder, 17 gr.; bullet, 98 gr.



98 gr.



83 gr.



50 gr.

chambered to take shells of either of the two lengths shown. The 17-gr. shell is generally preferred, as the 11-83 charge may also be loaded in it if desired. A gallery charge, consisting of 4 gr. of powder and a round bullet weighing 50 gr., may also be used in both shells. This affords a wide range of charges in one shell. A special feature of this cartridge is that the same sights used for the gallery charge at 12 yd. are suitable for the 11-83 charge at 50 yd. The full charge (17-98) in the long shell is the most accurate of all the black powder revolver cartridges. This ammunition, shot from a $6\frac{1}{2}$ -in. barrel, is capable of making ten-shot groups in a 2-in. circle at 50 yd., and a 5-in. circle at 100 yd. The 11-83 charge, under the same conditions, will also shoot in a 2-in.

circle at 50 yd. The 4-50 charge will shoot in a 1-in. circle at 20 yd. This cartridge also gives good results in single-shot pistols.

The .38 S. & W. is adapted to the Smith & Wesson, Colt, and other pocket revolvers. It is much more powerful than the .32 S. & W., and is consequently more practical and better adapted for a pocket revolver charge. When shot



FIG. 28. — Powder, 15 gr.; bullet, 146 gr.; exact cal., 0.358.

from a 4-in. barrel, groups of ten shots can be made in a 2-in. circle at 20 yd., and in a 6-in. circle at 50 yd. The gallery charge is 6 gr. of powder and a round bullet weighing 71 gr.

These two cartridges are adapted to the Colt and S. & W. Military revolvers. The first is the



FIG. 29.

Powder, 18 gr.; bullet, 150 gr.

Powder, 21½ gr.; bullet, 158 gr.; exact cal., 0.358.

regulation service charge, and the second is a more powerful special cartridge, and exceedingly accurate. From a 6-in. barrel six shots may be placed within a 6-in. circle at 100 yd. Smokeless

ammunition in this caliber gives equally good and uniform results; fifty to one hundred shots may be fired without cleaning and without sensibly affecting the accuracy.

The .38-.44 S. & W. is another cartridge designed for the S. & W. Russian Model revolver.



FIG. 30. — Powder, 20 gr.; bullet, 146 gr. 110 gr. 100 gr. 72 gr.
146 gr.; exact cal., 0.360.

It is more powerful than the .32-.44, but on account of the excessive fouling of this charge as now manufactured, the accuracy is impaired after the seventh shot. With an improved cleaner-shooting charge it would be accurate and extremely popular for target-shooting. This cartridge was originally designed and made for Chevalier Ira Paine, the noted pistol shot. Like the .32-.44, the shell is straight and uncrimped, and the bullet is seated in it so that the point is flush with its mouth. Several reduced charges have been developed for this shell. The Ideal Manufacturing Company can furnish moulds for a conical bullet with a square base weighing 110

gr., or with a concave base weighing 100 gr. The powder charge for either bullet is 9 gr. This charge works well up to 50 yd. A smaller load is the regulation gallery charge of 6 gr. of powder and a round bullet weighing 72 gr.

The .44-cal. Russian¹ was until recently the most popular revolver cartridge for target-shooting. While it has sufficient power to make it an effective charge for military service, it possesses, at the same time, remarkable accuracy. In the S. & W. Russian Model, or the Colt New Service



FIG. 31.— Powder, 23 gr.; bullet, 246 gr.; exact cal., 0.429.

revolver, the recoil is not so great as to be unpleasant, and the fouling is much less than that of many smaller charges. The fouling of the full charge load with black powder begins to “cake” or harden in the barrel after the twentieth shot, and, to get the best results, the barrel should be cleaned after every ten shots. Nearly all the great records in revolver shooting have been made with this ammunition, and most of the important matches have been won with it. A great deal of

¹ So named after its adoption as the service ammunition of the Russian cavalry.

experimental work has been done with this cartridge, and many reduced charges have been evolved. The Ideal Manufacturing Company can furnish moulds for the following bullets:—

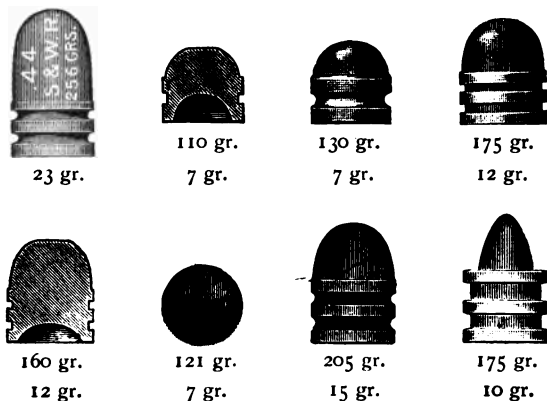


FIG. 32.



FIG. 33.— Powder, 40 gr.; bullet, 250 gr.; exact cal., 0.454.

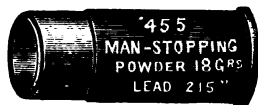


FIG. 34.

The weight of each, with the corresponding powder charge, is given. These various loads adapt this shell to almost any conceivable require-

ments in revolver shooting. The accuracy of the various charges fired from a $6\frac{1}{2}$ -in. barrel is as follows:—

CHARGE	DIAMETER OF CIRCLE ENCLOSING GROUP OF 10 SHOTS				
	20 yds.	30 yds.	50 yds.	100 yds.	200 yds.
23-246	1 in.	$1\frac{1}{2}$ in.	$2\frac{1}{2}$ in.	6 in.	15 in.
7-110	1 in.	2 in.			
7-130	$1\frac{1}{4}$ in.	$2\frac{1}{2}$ in.			
12-160		2 in.	3 in.		
12-175		$2\frac{1}{2}$ in.			
7-120	$1\frac{1}{4}$ in.	$2\frac{1}{2}$ in.			
15-205		2 in.	3 in.	7 in.	
10-175	$1\frac{1}{4}$ in.				

Revolvers are sometimes chambered for the .44-40-200, the .38-40-180, and the .32-20-115 rifle cartridges. These charges are not as accurate as the .44 Russian, but can be relied on to shoot inside a 5-in. circle at 50 yd. These cartridges are desirable only when it is an advantage to use the same ammunition in the rifle and revolver, or in certain localities where only a few varieties of ammunition are to be had. The large powder charge makes the recoil of the first two cartridges named rather unpleasant. The 32-20

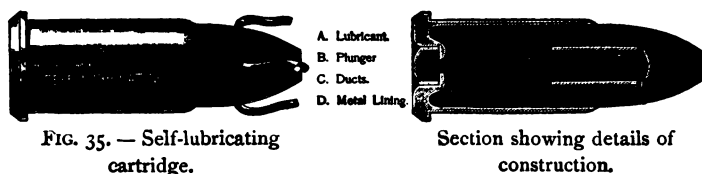
-.115 is the most accurate of these cartridges, and gives the best results in the pistol or revolver. All these cartridges having flat-pointed bullets are well adapted for game shooting. There are no gallery loads for these cartridges.

The .45 Colt Army is the most powerful of all the revolver cartridges. It was formerly the United States army service ammunition. The charge was so heavy, and the recoil so excessive, that it was almost impossible to shoot it without flinching. The service charge was afterward modified to 28 gr. of powder, which made it much more desirable and serviceable. With the latter charge this cartridge is very similar to the .45-30-250 Scofield Model S. & W. cartridge. Both of these are sufficiently powerful, accurate, and clean-shooting to render them suitable for military service. The gallery load for the .45 Colt is 7 gr. of powder and a round bullet weighing 139 gr.

The caliber of the service ammunition for the revolver of the British army is .455. This is a very accurate cartridge, but not as powerful as the corresponding military cartridges as used in this country. A special cylindrical bullet with a deep convex hollow point is furnished in the same shell and is known as the "man stopper."

This form of bullet is used in the .450 and .38 cal. cartridges also. The .450-13-225 is another English cartridge that is accurate, and pleasant to shoot. It is used largely at Bisley in the annual revolver competitions of the National Rifle Association of Great Britain.

In order to avoid excessive fouling, a self-lubricating bullet has been invented and introduced by Smith & Wesson, which can be furnished



in all calibers above .32. The bullet has a hollow core open in the rear. Lubricant is filled into the core, after which it is closed with a lead plunger. Four small ducts communicate from the forward end of the core to the exterior of the bullet just ahead of its bearing on the barrel. At the moment of discharge the plunger is driven forward, forcing the lubricant through the ducts into the barrel ahead of the bullet.

This bullet has given excellent results. With it a hundred or more shots may be fired with

black powder ammunition without causing sufficient fouling to impair the accuracy.

Nearly all the cartridges that have been referred to were originally designed for black powder. The various manufacturers can now supply them loaded with smokeless powder at a very slight advance in price. The cartridges are loaded so as to give approximately the same velocity as black powder.

The accuracy and uniformity with smokeless powder was not at first equal to that of the black, but with a better knowledge of the action and behavior of smokeless powders, these difficulties have been overcome and the smokeless ammunition now gives not only superior accuracy and reliability, but also causes much less fouling and smoke and has a lighter report. In "gallery" ammunition light conical bullets have entirely superseded spherical bullets, and smokeless powder is almost invariably used.

The following table gives the muzzle velocities, etc., of the principal factory-loaded, smokeless pistol and revolver cartridges. The factories aim to keep the muzzle velocities uniform for each cartridge. To produce this result with the various brands of smokeless

powder, all of which differ more or less in strength, the weight of the powder charge necessarily varies. Even when purchased in large quantities, different blends and packages of the same brand of powder occasionally vary

MUZZLE VELOCITIES, PENETRATION, ETC., OF
FACTORY-LOADED SMOKELESS PISTOL AND
REVOLVER CARTRIDGES

CASE OR SHELL.	Weight of Bullet, Grams.	Length of Barrel.	Average Muz- zle Velocity.	Average } Muzzle } Energy } Wv ² } 2g }	Penetration in 1/8 in. pine boards.
.22 Long Rifle (Rim Fire).....	40	28'	983	86	5
.30 Luger Automatic.....	93	4 ¹ / ₅	1134	266	10
.30 Mauser "	85	5 ¹ / ₂	1308	322	12
.32 Colt "	71	4	1010	161	6
.32 Smith & Wesson	88	10	902	159	4
.32 " " " Long.....	98	6	794	137	4
.32 Short Colt.....	80	6	768	105	3
.32 Long "	81	6	847	129	4
.32 Colt New Police.....	100	4	790	139	3 ³ / ₄
.38 Smith & Wesson.....	146	4	798	217	5
.38 " " " Special...	158	6 ¹ / ₂	885	275	8
.38 Colt New Police	150	4	722	170	5
.38 Short Colt	125	6	651	117	3
.38 Long "	148	6	786	203	4 ¹ / ₂
.38 Colt Automatic.....	130	6	1070	336	9
.41 Short Colt.....	163	6	693	174	5
.41 Long "	195	6	729	230	5
.44 Smith & Wesson Russian..	246	10	831	377	6
.45 Colt... ..	250	7 ¹ / ₂	776	334	5
.45 Colt Automatic.....	200	5	816	296	6

somewhat in strength. For these reasons it is impracticable to designate the exact weight or volume of any brand of powder which will in all cases produce the muzzle velocities referred to in the table.

The following additional smokeless charges have been developed by some of the expert revolver shots and will give excellent results. Loads No. 6 and 10 are recommended for gallery and 20-yd. shooting only; the rest will give good results at 50 yd. No. 1 and 5 are hunting charges:

ADDITIONAL SMOKELESS POWDER CHARGES

Number.	Case or shell.	Diameter of bullet.	Weight of bullet in grains.	No. of bullet in Ideal Handbook.	Proportion of tin to pure lead.	Brand of Smokeless Powder.	Weight of powder in grains.
1.	.32 S. & W. Hand Ej.	.313	118	3118	1 to 30	Hazard No. 2 Rifle.....	6.0
2.	.38 " "	.360	130	360271	1 to 30	du Pont & Co.'s Bull's-eye..	2.3
3.	.38 S. & W. Special	.360	114	36072	1 to 30	" " "	2.4
4.	.38 " "	.360	130	360271	1 to 30	" " "	2.3
5.	.38 " "	.360	150	360271	1 to 20	" " "	3.8
6.	.44 S. & W. Russian	.431	110	U.M.C.	1 to 30	" " "	2.3
7.	.44 " "	.431	160	429106	1 to 30	" " "	2.5
8.	.44 " "	.431	175	429220	1 to 30	" " "	2.5
9.	.44 " "	.431	205	429215	1 to 30	" " "	3.0
10.	.45 Colt.....	.457	144	457130	1 to 30	" " Shot-gun..	8.0

In all the above charges the shells have a medium crimp on the middle of the front band of the bullet.

With the introduction of the magazine pistol,

special smokeless cartridges have been devised that are rimless and have a crease around the base of the shell by which they may be held and manipulated by the mechanism. This ammunition is furnished loaded with full mantled and "soft nose" bullets, the latter for hunting purposes.

When fired from the regulation arms, this ammunition is capable of placing ten shots inside a 3-inch circle at 50 yd., and inside a 7-inch circle at 100 yd. These cartridges are exceedingly clean-shooting. Several hundred rounds may be fired without causing more fouling than is apparent after the first few shots. The full mantled or metal cased bullet ammunition has been adopted for military and naval service by a number of foreign countries. Elaborate tests of ammunition loaded with such bullets have also been made in this country.

The metal cased bullet has undoubted advantages in rifle ammunition, in which low tra-



Powder, 8 gr. (smokeless); bullet, 105 gr.; exact cal., 0.358.



Powder, 5¼ gr. (smokeless); bullet, 93 gr.; exact cal., .3016.



Powder, 7½ gr. (smokeless); bullet, 85 gr.; exact cal., .3008.

FIG. 36.

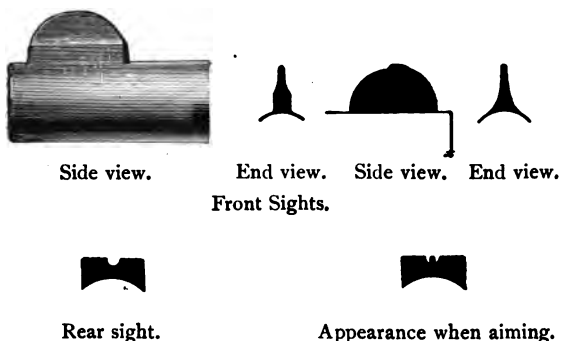
jectory and extreme long range are *desiderata* that can be obtained only by high velocities. In ammunition for magazine pistols and revolvers, however, the prime object is to deliver the most effective blow possible at comparatively short range.

The velocities attainable in large calibres within the permissible weight of an automatic pistol are comparatively low. The deformation of any bullet on striking animal tissue is in direct proportion to its velocity. It is, therefore, extremely doubtful that a metal cased bullet will ever prove as effective and satisfactory in "stopping power" and for military service, either in the automatic pistol or the revolver, as the large calibre lead bullet.

The metal cased bullet ammunition for the automatic pistols now on trial in the U. S. Army is of .38-cal. and .45 cal. The .38-cal. arms and ammunition were issued in 1903, and the .45-cal. in 1907. In the latter the metal cased bullet weighs 250 grains. As neither of these charges have the muzzle energy or stopping power of the .44-cal. Smith & Wesson Russian, or the .45-cal. Colt, it is not probable that either will be adopted.

SIGHTS

The purpose of sights is to assist in aiming. The national organizations allow only "open" sights in pistol and revolver shooting. "Peep" or "aperture" sights are barred. The rear sight usually consists of a notch shaped like a V or a U, the notch being as wide on top as at any part.



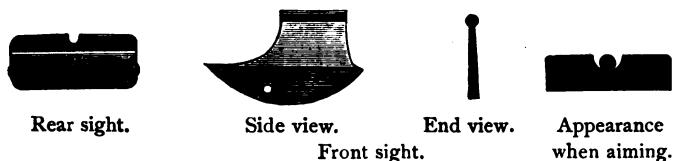
Front Sights.

Military Sights.

FIG. 37.

The front sight is a piece of thin metal set on edge. Sometimes the latter has a special shape or section resembling a pinhead when looking at it from the breech, as in aiming. Military sights usually consist of a plain notch in the top of the frame for the rear sight and a tapering front sight fixed to the barrel near the muzzle.

Target sights are made in endless variety to suit individual ideas. The sights most generally used for target-shooting are the "Paine" sights, named after Chevalier Ira Paine, who invented

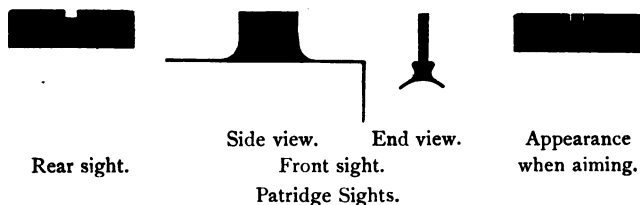


Rear sight. Side view. End view. Appearance
Front sight.
"Paine" Sights.

FIG. 38.

and was the first to use them. The rear sight is a flat bar with a semicircular notch, and the front sight is a "bead" sight; that is, a sight that resembles a pinhead when aiming.

Another sight that many of the best shots are using is the "Patridge" sight, developed by Mr.



Rear sight. Side view. End view. Appearance
Front sight.
Patridge Sights.

FIG. 39.

E. E. Patridge of Boston, Mass. The rear sight has a wide rectangular notch; the front sight is plain with a square top, as shown.

These sights have been referred to in the order in which they are most used. It is generally necessary for individuals to try various sights before they are able to select intelligently. In target arms different-shaped sights may be used in the same base or fitting, so that it is a comparatively easy matter to try any or all of these sights on the same arm.

The notch of the rear sight should have a bevelled edge concave toward the front. This will secure sharpness of outline in any light. The front sight should also be distinct and is found to be most satisfactory when the side toward the eye is a surface at right angles to the line of sight.

POSITION

The position in pistol and revolver shooting is very important. In firing a long series of shots, a man with an easy, natural position will suffer much less fatigue, and will have a decided advantage over another whose position is straining and uncomfortable. Formerly the approved position was to stand with the right side toward the target. This required the head to be turned ninety degrees from its natural position, and was very

uncomfortable. Undoubtedly this position is a relic of duelling days, when it might have been argued that a smaller mark was offered to the antagonist.

The positions adopted by the leading shots vary considerably. Most of them face a trifle to the left of the target, with the right foot 6 or 8 inches ahead of the left, and pointing directly toward the target, the weight of the body supported equally by both legs and perfectly balanced. Others shoot with the feet close together; some with one or both eyes open, and with the arm partly or fully extended. The question of position depends largely upon the physique and comfort of the individual.

Mr. Winans' position is an exceedingly strong one. His poise is very good, and he stands firmly on both feet. The left arm falls straight down along the left side of the body. This affords rigidity when desired, and imparts action to the figure.

Mr. Axtell has a stanch, natural position. Like Mr. Winans, he shoots with the right arm fully extended, and he holds the weapon in the correct and most approved manner.

The position of Mr. Anderton is excellent. He



FIG. 41. — C. S. Axtell.



FIG. 40. — Walter Winans.



FIG. 42. — Thomas Anderton.



FIG. 43. — C. S. Richmond.



FIG. 44. — E. E. Patridge.



FIG. 45. — Sergeant Wm. E. Petty.



FIG. 46. — J. E. Gorman.



FIG. 47. — R. H. Sayre.

enjoys perfect health, and has his large muscular development well under control. His position is strong, natural, and comfortable. Another good position is that of Mr. Richmond. He is not as well poised as Mr. Anderton, but his position is graceful and businesslike.

The positions of Mr. Patridge and Sergeant Petty are characteristic and typical of persons of entirely different physique.

Mr. Gorman and Dr. Sayre are men of very similar physique. Their positions, which resemble each other closely, are firm, easy, and natural.

TARGET-SHOOTING

In the development of firearms and ammunition, target-shooting has always occupied an important place. It is regularly and systematically practised in the army and navy, in order to maintain and improve the proficiency of the men as marksmen. Target-shooting, with many different styles of firearms, under prescribed rules and regulations, has also become extremely popular with civilians.

A target is a mark or object of suitable form and color designed to be fired at. It usually consists of a frame covered with canvas or paper,

presenting a white surface with a prominent spot or bull's-eye in the centre. Concentric circles around the centre divide the target into zones which are assigned values, decreasing from the centre outward. On a regularly equipped range the targets are movable frames, so arranged that they may be raised to the firing position and then lowered into a pit, where the marker can safely examine the target, mark the shot accurately, and cover the shot-hole with a paster. The sum of the values of a limited series of consecutive shots, as 5, 7, 10, 20, 50, etc., constitutes a score.

Target-shooting was indulged in extensively with the rifle many years before it became popular with the pistol and revolver. The shorter barrel, and the greater difficulty in acquiring skill with the latter weapons, were doubtless responsible for the mistaken idea long prevalent that these arms were extremely inaccurate. When, however, a few individuals developed sufficient skill to obtain fine shooting, their performances were considered phenomenal. Among the first to obtain a high order of skill with the muzzle-loading pistol in the United States was Captain John Travers of Missouri. He was well known as an expert pistol shot as early as 1860. In that year Cap-

tain Travers shot an interesting individual match in St. Louis at a distance of 100 feet. Fifteen china plates, nine inches in diameter, were used as targets. Captain Travers broke 11 out of the 15, while his opponent broke but 9.

In 1865 Colonel William F. Cody (Buffalo Bill) and Captain William P. Schaaf of St. Louis became prominent as pistol shots. The latter subsequently joined Captain Travers in a three years' tour of the United States, giving exhibitions in nearly all the large cities.

About 1880 Ira Anson Paine, a native of Massachusetts, attracted attention by his fine marksmanship with the pistol. In 1881 he went abroad, and for a number of years he travelled over the principal countries of Europe, giving public exhibitions of his skill with the pistol and revolver. While in Portugal in 1882 he was knighted by the king in the presence of a notable assemblage, and made a chevalier of an ancient military order. In his exhibitions Chevalier Paine used a Stevens Lord Model pistol and a Smith & Wesson revolver. His skill with these arms was so far in advance of his contemporaries that he was popularly supposed to accomplish many of his feats by trickery.

Target-shooting with the pistol and revolver, as a sport, may be said to have originated at the annual meeting of the National Rifle Association at Creedmoor in 1886. During that meeting a revolver match was scheduled to be shot at 25 yd. on the 200-yd. Standard American Rifle Target. It was a reëntry match, with the three best scores of five shots each of any contestant to count. In this match three scores of 48 out of 50 were made, the highest individual aggregate of three scores being 143 out of a possible 150.

The same year a similar match was announced at the fall meeting of the Massachusetts Rifle Association at Walnut Hill. Chevalier Paine was a competitor in this match, and made 50-49-49 = 148 in six entries. The next best three scores equalled 142.

These matches proved so interesting and successful that target-shooting with the pistol and revolver became instantly popular all over the country. It was soon found that the arms possessed remarkable accuracy, and as the skill of the shooters improved the distance was increased to 50 yd., retaining the same target.

Mr. A. C. Gould, editor of *The Rifle*, and *Shooting and Fishing*, was the first to recognize

the possibilities of the pistol and revolver, and became greatly interested in the performances with these arms. He assisted and encouraged the shooters, witnessed their work, and made careful and elaborate records of all the important scores that were made in the United States from 1886 to 1900.¹ It was at his suggestion that Chevalier Paine essayed to fire the first 100-shot score at 50 yd. on the Standard American Target, scoring 791 points. This shooting was done with a finely sighted .44 cal. Smith & Wesson Russian Model Revolver, regulation full charge ammunition, and a $2\frac{1}{2}$ lb. trigger pull. A keen rivalry for the 100-shot record soon sprang up, resulting as follows: —

Oct. 15, 1886,	Chevalier Ira Paine at Walnut Hill	. .	791
March 7, 1887,	Chevalier Ira Paine “ “ “	. .	841
Nov. 4, 1887,	F. E. Bennett “ “ “	. .	857
Nov. 14, 1887,	F. E. Bennett “ “ “	. .	877
Dec. 5, 1887,	F. E. Bennett “ “ “	. .	886
Dec. 17, 1887,	Chevalier Ira Paine “ “ “	. .	888
Dec. 22, 1887,	Chevalier Ira Paine “ “ “	. .	904
Dec. 23, 1887,	W. W. Bennett “ “ “	. .	914

This rivalry led to a long newspaper controversy, and culminated in the famous Paine-Bennett revolver match. The conditions were

¹ See *The Modern American Pistol and Revolver*, by A. C. Gould. Bradlee Whidden, Publisher, Boston, Mass.

as follows: Stakes, \$1000.00; 100 shots per day for six consecutive days; Smith & Wesson Russian Model Revolvers, .44 cal.; factory-loaded full charge ammunition; trigger pull, 3 lb.; Standard American Target with 8-in. bull's-eye; distance, 50 yd. On the fifth day of the match, and while 9 points in the lead, Chevalier Paine entered a protest and withdrew. Mr. F. E. Bennett continued shooting, as stipulated in the match, scoring 5093 points for the total of the six days. The protest was referred to the National Rifle Association, which decided in favor of Mr. Bennett, awarding him the match and the championship of America.

In practising for this match Mr. F. E. Bennett, under the same conditions, made a score of 915. This record was not excelled until June 1, 1901, when C. S. Richmond of Savannah, Georgia, scored 918 points under substantially the same conditions.

During the summer of 1890 Mr. William E. Carlin, assisted by Mr. Hubert Reynolds, made a very elaborate series of tests with the revolver and various kinds of ammunition. The shooting was done with a telescopic sight, and from a sand-bag rest. The results obtained were remarkable,

and added materially to the definite information then available as to the capabilities of the revolver, the relative accuracy of different charges, etc.

A very interesting revolver match for a trophy offered by Mr. Walter Winans took place in 1892. Mr. Winans is a noted American revolver shot, residing in England, and the trophy—an American cowboy executed admirably in bronze—was modelled by him. The match was conducted by *Forest and Stream*. The trophy was won, after a spirited competition, by Dr. Louis Bell. Under the conditions of the match, the winner was to defend his title two years before the trophy became his property. The trophy was won successively by George E. Jantzer and Sergeant W. E. Petty. Sergeant Petty defended the trophy successfully for two years, and now holds it permanently.

The “best on record” performances with the single-shot pistol, on the Standard American Target, at 50 yd., are as follows:—

100 shots :

Sept. 22, 1888, F. E. Bennett, Walnut Hill, Mass.	. 906
Nov. 10, 1888, F. E. Bennett, “ “ “	. 934
Sept. 10, 1890, F. E. Bennett, “ “ “	. 936
Feb. 25, 1900, J. E. Gorman, San Francisco, Cal.	. 939
May 26, 1901, J. E. Gorman, “ “ “	. 942
March 1, 1902, E. E. Patridge, Walnut Hill, Mass.	. 942

50 shots :

Nov. 10, 1888, F. E. Bennett, Walnut Hill, Mass. .	470
Feb. 11, 1900, J. E. Gorman, San Francisco, Cal. .	471
May 20, 1901, J. E. Gorman, " " " .	474
Dec. 7, 1901, T. Anderton, Walnut Hill, Mass. .	476
April 4, 1903, T. Anderton, " " " .	480

A record, or "best on record," is the highest recognized score of any given number of shots fired under certain standard conditions, and with an arm complying with certain established rules. The records of pistol and revolver shooting in the United States were carefully established and compiled by *Shooting and Fishing* until the year 1900, when the records were intrusted to the United States Revolver Association. This association, with the support and coöperation of all the leading shots of the country, formulated rules and regulations to govern pistol and revolver shooting, and inaugurated the annual championship matches. These are shot simultaneously in different parts of the United States, thus giving everybody an opportunity to enter the competitions.

The influence of the association on pistol and revolver shooting has been very beneficial. It has established uniformity in arms, rules, etc., and has encouraged and conducted many friendly

matches between clubs, thus bringing the shots in different parts of the country in closer touch with each other. This association also negotiated and conducted the first international revolver match between France and the United States, which took place in June, 1900. This match attracted world-wide attention, and was won by the United States. The conditions of the match were as follows: Ten men on a side; the Americans to shoot at Greenville, N. J., and the Frenchmen in Paris. Results to be cabled. Each side to appoint an umpire to witness the shooting of the opposing side. Each man to shoot 30 shots on the French target at 16 metres and 30 shots on the Standard American target at 50 yd. Possible, 6000. Total scores: Americans, 4889; French, 4828.

A second international revolver match between France and the United States was arranged in 1903. The conditions were briefly as follows: Fifteen men on a side. Each man to shoot 60 shots in 10 strings of 6 shots each on the Standard American Target at 50 yd. Each side to appoint two umpires to witness the shooting of their opponents. Results to be cabled.

The American marksmen assembled at the

Walnut Hill range of the Massachusetts Rifle Association, near Boston, devoting three days to preliminary practice shooting and selecting the team. It was originally agreed upon that the match was to take place on June 30th, and the American team shot their scores on that day. Owing to delays in transportation, the targets intended for the French team did not reach them promptly and their side of the match was shot several days later. The members constituting the teams and their respective scores are as follows:

AMERICAN TEAM.

O. I. Olson, Duluth, Minn.....	554
B. F. Wilder, New York, N. Y.....	543
R. S. Hale, Boston, Mass.....	540
J. A. Dietz, Jr., New York, N. Y.....	534
W. A. Smith, Springfield, Mass.....	532
C. S. Axtell, Springfield, Mass.....	530
Louis Bell, Boston, Mass.....	527
T. Anderton, Boston, Mass.....	523
J. B. Crabtree, Springfield, Mass.....	519
I. R. Calkins, Springfield, Mass.....	519
E. E. Patridge, Boston, Mass.....	517
R. H. Sayre, New York, N. Y. (Score shot in Paris).	515
J. T. Humphrey, Boston, Mass.....	513
W. S. Amory, 2d, Boston, Mass.....	512
C. L. Bouvé, Boston, Mass.....	511
<hr/>	
Team total	7,889

FRENCH TEAM.

Comte de Castelbajac, Libourne,	547
Commandant Py, Saint Omer	542
M. Dutfoy, Marseilles.	541
Captain Moreaux, Rennes	529
M. Moline-Paget, Dieppe	526
Captain Chauchat, Versailles.	524
M. Keller-Dorian, Lyons.	522
M. Feugray, Paris.	509
M. Despasio, Lyons	503
M. Lecocq, Paris	502
M. Caurette, Ham	502
M. Louvier, Paris.	496
M. Balme, Paris	469
Adjutant Paroche, Rennes.	466
M. Sartori, Paris.	462
Team total	7,640
Americans led by	249

A careful analysis of the scores shows that the Americans shot much more evenly than the Frenchmen, and that the skill of the three high men on both teams was approximately equal.

In order to become familiar with the arms and develop skill in shooting, careful and systematic practice is necessary. This can be most conveniently and intelligently obtained in target-shooting. At a properly equipped range, each shot is "spotted"¹ as fired, so that the shooter can tell instantly where each shot strikes. This is a great aid and

¹ The position of a shot accurately indicated by a marker from a pit or safe place near the target.

advantage, as it enables the shooter to note the effect of changes in light, wind, slight displacements in the sights, etc., and modify his work accordingly. The usual distance is 50 yd. Very good shooting has been done at 100 yd., and even at 200 yd., but such long-range shooting is rarely attempted except by the very best shots. The whole target being so small at that distance, a shot need not be very wild to miss the target. Such an occurrence is very unsatisfactory and disconcerting to a fairly skilful shot. There is, moreover, nothing to be gained by extremely long-range work. The pistol and revolver are not designed for it, and there is much more pleasure and satisfaction in shooting at the shorter ranges.

It is customary and desirable to practise at the target under the conditions governing the annual championship matches. This accustoms one to those conditions, and is a decided advantage if one expects to enter the competitions. It is also excellent training for record shooting. In target practice with military arms, regulation full-charge ammunition should be used in all cases, especially when practising rapid-fire shooting. With target weapons, reduced charges are frequently used, and the shooting is generally slow and deliberate.

. The target used by the United States army for revolver practice is the regulation silhouette man target.

This consists of the figure of a man standing, and is used for both mounted and dismounted practice. For the mounted practice the target consists of a steel skeleton frame, covered with cloth and black paper, and is held in position by supporting rods and braces. This is designated as "Target D." Five of these targets are set up at a distance of 10 yd. and 20 yd. apart, and the troopers ride by them on the walk, trot, and gallop, firing one shot at each target as they pass. This practice is modified by changing the position of the targets so the position will be 25, 20, 15, 10, and 5 yd. respectively, and shooting to the right, left, and rear. Ten shots per man are also fired at "Target K"—the silhouette figure of a mounted soldier.

All revolver target practice consists of two classes, "Preliminary" and "Record," the latter being incorporated in the official reports. Five shots constitute a score. The target used for the dismounted practice is known as target "A1," consisting of a rectangle 6 ft. high and 4 ft. wide, with a circular black bull's-eye and

seven concentric rings, with values and diameters as follows: Bull's-eye or 10 ring, 5 in.; 9 ring, $8\frac{1}{2}$ in.; 8 ring, 12 in.; 7 ring, $15\frac{1}{2}$ in.; 6 ring, 19 in.; 5 ring, $22\frac{1}{2}$ in.; 4 ring, 26 in.; 3 ring, 46 in.; 2 rectangle, rest of target.

The "Preliminary" practice consists of two scores slow fire with a time limit of 30 sec. per shot at each of the ranges 50 yd. and 75 yd.; two scores timed fire with a time limit of 30 sec. per score, 25 yd. and 50 yd.; and two scores rapid fire with a time limit of 10 sec. per score at each of the ranges 15 yd. and 25 yd.

The "Record" practice, or competition proper, is the same as the "Preliminary" practice except that the course will be fired through twice, the total number of scores being at each range for each class of fire, four, instead of two. The order of sequence of the classes of fire (slow, timed, or rapid) is determined by the officer in charge of the competition, and so as to secure as nearly as possible equal conditions of firing for all competitors. In firing scores within a specified time limit the range officer gives the commands, "Ready," "Fire." At the command "Ready," the competitor at the firing point raises his piece into position and begins

to fire immediately after the command "Fire."

Gold, silver, and bronze medals are awarded to those making the highest scores. The regulations provide for annual competitions in each department, and in each even-numbered year a competition between representatives of all the departments.

The revolver practice in the U. S. Navy consists of two classes, designated the Marksman's Course and the Sharpshooter's Course. Each course is subdivided into "Instruction Practice" and "Record Practice."

All shooting is done on target "A," which is a rectangle 6 ft. high by 4 ft. wide, with a circular black bull's-eye 8 in. in diameter, counting 5, and concentric circles of count with diameters as follows: 4 ring, 26 in.; 3 ring, 46 in.; 2 rectangle, rest of target.

The men are required to make 80 per cent. of the possible in the marksman's course before they can proceed on the sharpshooter's course.

Marksman's Course (slow fire).

Instruction Practice :

At least 1 string of 6 shots, each range: 15 yd., 25 yd., 50 yd.; no time limit.

Record Practice :

At least 1 string of 6 shots, each range : 15 yd., 25 yd., 50 yd. ; time limit, 5 min.

Sharpshooter's Course (rapid fire).**Instruction Practice :**

6 shots, each range : 15 yd. ; 25 yd ; 50 yd. ; time limit, 18 sec.

Record Practice :

6 shots, each range : 15 yd. ; 25 yd. ; 50 yd. ; time limit, 18 secs.

In the rapid fire practice the timing is done by having the target appear and disappear, remaining in position for firing 18 seconds.

In addition to the above regulation practice, the men are put through a thorough preliminary course of position, sighting and aiming drill.

The more expert men are given advanced practice in snap, double-action and left-hand shooting, also firing alternately at targets at different distances and at floating objects at unknown distances.

The revolver course adopted by the National Guard in 1907 is divided into three classes, as follows : Marksman, Sharpshooter and Expert, using target "A" (the same as used in the U. S. Navy).

Course for qualification as marksman and sharpshooter :

Distances, 15, 25, and 50 yards.

15 yards: 2 scores, rapid fire, 10 seconds to each score of 5 shots.

25 yards: 2 scores, rapid fire, 10 seconds to each score of 5 shots.

25 yards: 2 scores, timed fire, 30 seconds to each score of 5 shots.

50 yards: 2 scores, slow fire, 1 minute to each shot, 5 shots to each score.

Necessary for qualification as marksman : Sixty-five per cent. of possible score, or 130 out of 200 points. Necessary for qualification as sharpshooter : Eighty per cent. of possible score, or 160 out of 200 points.

Course for qualification as expert (open to sharpshooters only) :

Distances, 15, 25, 50, and 75 yards.

15 yards: 2 scores, rapid fire, 8 seconds to each score of 5 shots.

25 yards: 2 scores, rapid fire, 8 seconds to each score of 5 shots.

25 yards: 2 scores, timed fire, 20 seconds to each score of 5 shots.

50 yards: 2 scores, timed fire, 20 seconds to each score of 5 shots.

75 yards: 2 scores, slow fire, 20 seconds to each shot, 5 shots to each score.

Necessary for qualification as expert: Eighty per cent. of possible score, or 200 out of 250 points.

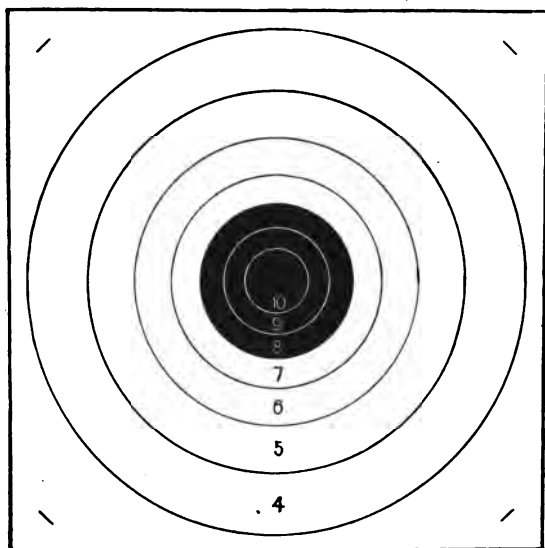


FIG. 49. — Standard American Target.

Diameter of Circles

10 circle	. . . 3.36 inches	} Bull's-eye	6 circle	. . . 14.80 inches
9 "	. . . 5.54 "		5 "	. . . 19.68 "
8 "	. . . 8.00 "		4 "	. . . 26.00 "
7 "	. . . 11.00 "			

Rest of target, 28 × 28 inches.

The conditions of the Annual Championship Matches of the United States Revolver Association are excellent, and well adapted to stimulate improvement in the arms and develop the highest order of marksmanship. These matches are described in detail in the appendix.

The official target of the United States Revolver Association, which is used in the annual championship matches and for record shooting, is the Standard American Target. This target is also used by nearly all the shooting clubs and organizations in the United States. For 50-yd. shooting the bull's-eye is 8 in. in diameter and contains the 8, 9, and 10 rings. This target is well suited for target practice at this range. It has been used extensively since 1886. Ten shots, with one hundred for the possible, usually constitute a score. For gallery shooting at 20 yd. this target is reduced so that the bull's-eye is $2\frac{72}{100}$ in. in diameter, and for 10-yd. shooting 1 in. in diameter. In indoor shooting smokeless powder and reduced charges are always to be preferred. Where artificial ventilation is provided, some shooting may be done with black powder ammunition, but the range soon fills with smoke, rendering the targets indistinct and the atmosphere unpleasant. Gal-

lery practice is very valuable, as it enables one to preserve good form in the winter months, in localities where it is too cold to shoot with comfort and pleasure out-of-doors. An arm of large caliber has a decided advantage over one of small caliber in short-range shooting, on account of the larger hole made by the bullet, and, for this reason, the large calibers are preferred for gallery shooting. For distances less than 25 yd. not more than five shots should be fired on a paper or cardboard target. In case a close group is made, the scoring will be much easier and more accurate than when ten shots are fired at a single target. The best grades of target arms, including all those illustrated in this chapter, are capable of making "possibles" or perfect scores on the standard American target, using regulation ammunition. To make high scores is therefore simply a question of skill on the part of the shooter.

A great many other targets designed principally for rifle-shooting have been recommended at different times by well-known and scientific marksmen. Some of these targets possess much merit and have become popular in certain localities. It is unquestionably a mistake to introduce new targets in this manner as long as satisfactory

targets are in general use, and on which all the important matches and records have been shot. The merit of a score on a new target cannot be judged by those unfamiliar with it, and frequently a highly meritorious score fails to receive the recognition it deserves on account of having been shot on a comparatively unknown target.

In selecting a target for longer ranges than 50 yards it is always preferable to have the bull's-eye sufficiently large so as to be seen with ease and comfort when sighting. Small bull's-eyes strain and tire the eyes and have no advantage whatever.

In England and France the targets generally have smaller bull's-eyes than here. At Bisley, the shooting is principally at a distance of 20 yards on a bull's-eye 2 in. in diameter. At 50 yards the bull's-eye is 4 in. in diameter. The English targets have no circles of count within the bull's-eye. The regulation targets of the United Shooting Societies of France have bull's-eyes 5 and 6 centimetres in diameter for the pistol and revolver respectively, at 20 metres, and 20 centimetres in diameter for 50-metre shooting. All these targets have two or more circles of count within the bull's-eye.

REVOLVER PRACTICE FOR THE POLICE

┌ The revolver is a part of the regular equipment of the police force of nearly every city in this country. Unfortunately, the general lack of any regulations for the care of and practice with these arms largely nullifies their usefulness. Even in the large cities, members of the police force frequently admit that they have not used or cleaned their arms for six months, or more. An inspection of the arms under such conditions not infrequently reveals the fact that center-fire arms are loaded with rim-fire ammunition, and *vice-versa*. The mechanism is often so badly rusted that the cylinder will not revolve and the barrel so corroded as to seriously impair its accuracy. When occasion requires the use of the arms under such conditions, accidents almost invariably result, either to the policemen who attempt to fire the arms, or to innocent bystanders and property.

* The records of every large municipality show that large sums are annually disbursed in litigation and to individuals who have suffered either personal wounds or property damage from accidents of this character.

By adopting suitable arms, and regulations governing practice shooting with them, it is entirely practicable and comparatively easy to train a large police force to become good marksmen. The possibility of accidents is thus reduced to a minimum and the efficiency of the men increased to a maximum. The moral effect of a high order of marksmanship of an entire police force, when generally known, cannot be over-estimated. Practice and skill in the use of the revolver embodies the essential elements of rifle shooting, so that in case of riot, insurrection, or war, a large police force could be made quickly available for duty with very little additional instruction, by arming them with rifles.

A practical plan to develop such results is as follows: The services of a competent person to teach the men must first be secured. This man should be an experienced and skilful marksman with the revolver and be qualified to maintain proper discipline and teach the subject in all its details. A suitable range must next be provided. Two men from each precinct selected for their fitness to become instructors should then be detailed to take a prescribed course of training and practice under the teacher referred

to. Each of these men should devote not less than four hours a week to this course. In four months' time these men should be qualified to undertake the work of training and instructing others under the inspection and supervision of the original teacher. After providing sufficient range facilities, squads of men from each precinct should then be detailed for practice and instruction under their own instructors, devoting at least two hours per man per week to this work. At least one and one-half hours of this time should be devoted to actual practice shooting. After sufficient skill has been developed, teams of the different precincts should shoot matches with each other, which will keep up a friendly rivalry and promote interest in their work.

By adopting such a plan it is possible, within a year from its inception, to convert an entire police force into perfectly safe and reliable shots of good ability; *i. e.*, such ability as would enable all of them to hit an object the size of a man every time at 100 feet. The mistake is sometimes made of requiring the men to practice during off-duty time; this has never proved successful.

After the first year, or after a sufficient degree of skill has been developed, the efficiency of the men can be preserved and maintained by devoting an hour every two weeks to regulation practice. There is little doubt but that the cost of the time and ammunition devoted to such a course of training would be more than offset by the elimination of a large portion of the accidents, litigation, etc., that result under the present conditions.

Much of the efficiency that it is possible to attain depends upon the character of the regulation arm that may be adopted for police service. Such an arm should be of large calibre and sufficient power to fulfil the requirements. When carried in the pocket the perspiration of the body causes rust, and a nickel finish will generally be more serviceable than any other. The sights, hammers and other projections should be of suitable form, and as referred to in the text under "Pocket Arms." In order to secure suitable accuracy, the barrel should be 4 in. in length and the trigger pull 4 lbs. A first-class weapon for police service is the .38-cal. Smith & Wesson safety hammerless, the .38-cal. Colt New Police, or the .32 cal. side

swing action Smith & Wesson or Colt revolvers. The .38-cal. Smith & Wesson safety hammerless is particularly well adapted for police service, the safety feature making accidental discharge almost impossible, and being also a decided advantage in case the weapon should fall into the hands of an unskilled antagonist.

In all cases a regulation arm and ammunition should be adopted so as to secure uniformity and involve the purchase of only one line of supplies and ammunition.

PISTOL SHOOTING FOR LADIES

The great majority of ladies have some inherent dread of all varieties of fire arms. This no doubt is largely due to the senseless and irresistible desire of inexperienced persons to indulge in a mock-heroic display and flourish of such arms when in the presence of ladies. All useless demonstration and ostentation with fire arms serves only to distinguish those who are unfamiliar with their proper manipulation and use. Persons handling arms in this manner should be avoided, or promptly compelled to desist. Many of the accidents of the "I did

not know it was loaded" order occur in this manner.

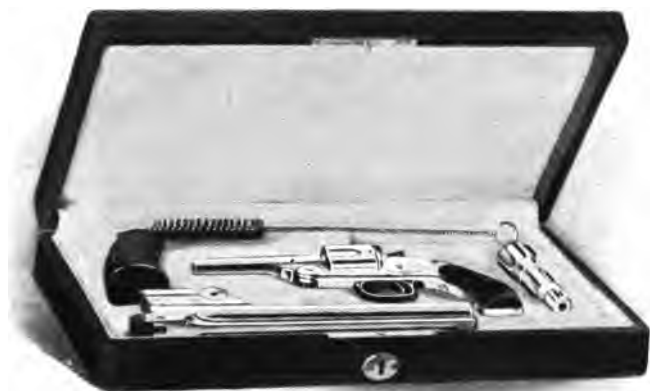
There is nothing occult or mysteriously dangerous about fire arms, but their potential power must never be forgotten in handling them. As a weapon of defense the revolver places the weakest and most diminutive person skilled in its use, on an equality with the most powerful antagonist. Ladies who travel extensively and visit semi-civilized countries, especially the wives and daughters of army and navy officers assigned to foreign stations, should be thoroughly familiar with fire arms and skilled in their use. The necessity of knowing how to shoot, like knowing how to swim, may occur but once in a woman's lifetime, but when occasion does require either, it is generally under circumstances involving peril to life, and for that reason both are advantageous and valuable accomplishments. Every woman should, therefore, be sufficiently familiar with fire arms to know how to handle them safely, and, in an emergency, to use them with intelligence. While skill in the use of the pistol and revolver is a useful accomplishment, the practice shooting with these arms will prove exceedingly in-

teresting. Target practice with the .22-cal. pistol is particularly well suited for ladies, and those who have had the opportunity to indulge in it, have invariably found it an enjoyable and fascinating pastime. There is every reason, too, to believe that ladies would excel and develop a higher order of skill in pistol shooting than gentlemen, because they are generally more temperate and possess a more delicate nervous system.

A number of civilian shooting clubs have successful ladies' auxiliary clubs, and there are at the present time a large number of ladies who are skillful markswomen with the pistol and revolver.

Any of the target pistols referred to in the text under the subject of Arms (except the Remington pistol, which is a very heavy piece) are suitable for ladies' use. A very serviceable and handsome combination is furnished by Smith & Wesson, which consists of their regular target pistol with a 10-inch barrel and an interchangeable .38-cal. revolver barrel and cylinder, fitting to the same stock. These are furnished in a special case with cleaning rods, etc., making a complete and attractive outfit.

It is well to begin practice with a .22-cal. pistol, as this is a light and very pleasant charge to shoot, and the tendency to "flinch" is reduced to a minimum. After a fair degree of skill has been developed with the .22-cal. pistol,



COMBINATION SET.—Smith & Wesson .38-Cal. Revolver, .22-Cal. Pistol, Utensils, etc., in Case.

reduced charges with a revolver may be tried, and from this stage the practice shooting can progress to the regulation full charges. It is desirable that ladies should have a little practice with the revolver with full charged ammunition, so as to be able to manipulate them with sufficient skill in case of necessity.

CLUBS AND RANGES¹

Whenever three or more persons in any locality are interested in rifle or revolver shooting, a club can generally be organized and additional members secured. If the business affairs are properly and conservatively managed, much pleasure will result for the members at a nominal cost. Approximate ideas of the cost of constructing and maintaining ranges and indoor "galleries" can generally be obtained by communicating with the officers of existing clubs. In preparing the Constitution and By-Laws, that of the U. S. Revolver Association will be an excellent guide. The secretary-treasurer of that association will be able to give valuable assistance to new clubs.

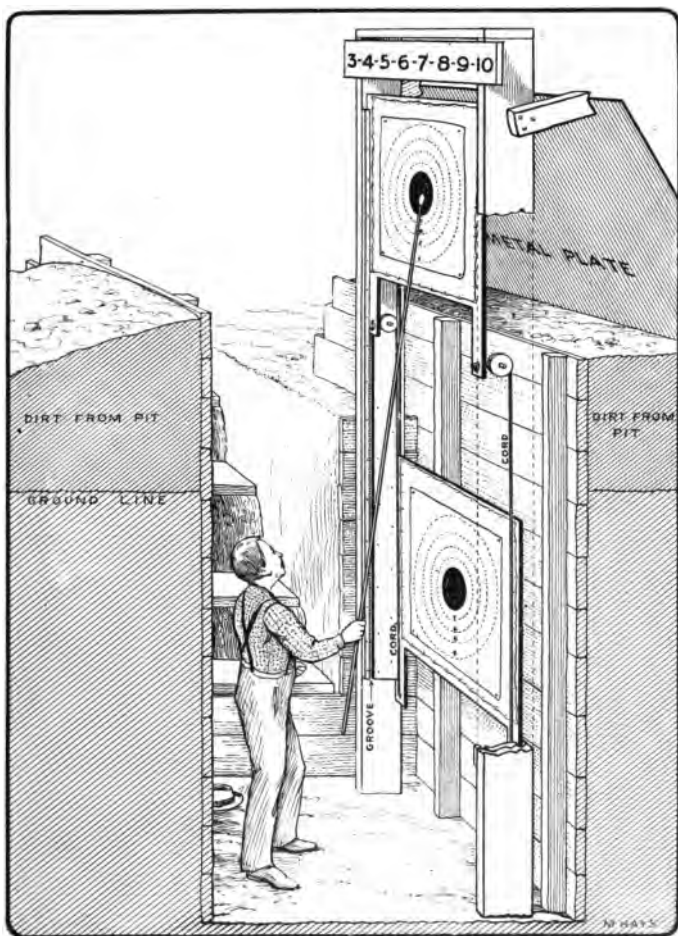
The first requisite of a shooting club is a suitable range. A 50-yard range adapted for pistol and revolver practice can be constructed at a comparatively small expense. At the firing point a room or house should be provided with booths at least 3 ft. wide, with openings facing the targets. A substantial butt must be pro-

¹ For a complete detailed description of range construction, including illustrations, practical working drawings, etc., the reader is referred to *Rifle Range Construction*, published by The E. I. du Pont Powder Company, Rifle Smokeless Division, Wilmington, Delaware.

vided behind the targets to stop the bullets, including the wildest shots. This should be an earthen embankment, or may be a natural uninhabited hill with a steep slope toward the range. The range should be measured and laid out by an engineer, or other competent person using a steel tape. A pit at least $8\frac{1}{2}$ ft. deep should be dug for the safe accommodation of the markers, and provided with a safely shielded side entrance. The uprights and other target framing should set against the back side of this pit. The width of the pit from the framing toward the firing point should be 5 ft., and the length should be made about $3\frac{1}{2}$ ft. for each set of alternating targets. The alternating target frames to which the targets are to be attached may be of wood covered with canvas, and should be at least 3 ft. square. These should be so arranged that they can easily be moved up and down between the vertical posts in grooves or slides, like "double hung" window sash, and so as to balance each other by means of cords running over pulleys located in the posts at about the height of the bottom of the target when in its highest position, the cords being attached to the lower corners of the

frames. They should be adjusted so that when one target is at the top and in position to be fired at, the other is at the bottom of the pit. Over each set of alternating targets and attached to a cross piece at the top of the uprights should be placed large numbers from 3 to 10 inclusive, for marking each target. A roof or shelter should be erected so as to shade the target and keep out the rain. Suitable timbers should be provided to protect the slides or grooves between the targets from damage by wild shots. Steel plates are sometimes placed a short distance behind the targets, slanting forward at the top, to positively stop the majority of the bullets, but these must be far enough behind the targets that the spatter of the lead will not injure the men in the pit. If possible, have the targets so located that they are due north of the firing point.

Such a range is operated as follows: A marker is sent into the pit for each target to be operated; paper targets having been pasted to the canvas on the frames a sufficient length of time previously so as to be dry. The marker pulls down one of the targets which raises the other into the firing position. As soon as the shot is fired, the marker, using a 10-ft. rod with



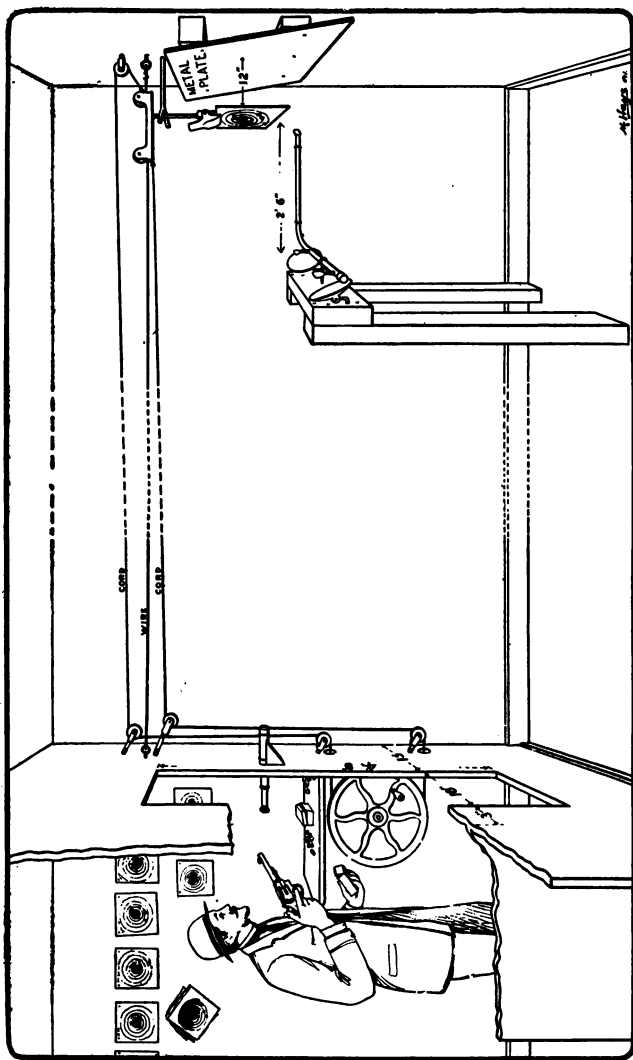
Details of Alternating Targets, Pit, etc., for 50-Yard Range.

an iron disc $2\frac{1}{2}$ -in. in diameter fastened on the end as a pointer, "spots" the shot by placing the disc over the bullet hole, and then pointing to one of the numbers over the target corresponding to the value of the shot. The disc on the pointer should have one side painted white so that it can be easily distinguished when covering shots in the bull's-eye.

The scorer at the firing point then scores the shot as indicated by the marker. The marker then raises the target at the bottom of the pit in position for the next shot, which brings the first target down into the pit where the marker covers the bullet hole with a paster. This operation is repeated for each shot.

Where a score of ten consecutive shots is to be made on each paper target, the target is fastened to the frame with double pointed carpet tacks and left in the firing position until the ten shot score is completed, each shot being "spotted," marked, and scored as fired. When the score is completed, another paper target having been placed on the alternating frame in the pit, the latter is raised in position promptly ready for the next score.

In large cities it is often necessary to provide



Details of Booths at Firing Line, "Trolleys," and Butt for Gallery Ranges.

a suitable range for target shooting indoors and by artificial light. Such a range is designated a "gallery." The standard range is 20 yd. for the revolver and pistol, and 25 yd. for the rifle. The arrangement at the firing point is practically the same as in the case of the 50-yd. ranges, the booths being at least 3 ft. wide. On account of the small size of the target and the short distance, it is feasible to move the target back and forth from the firing point to the butt by "trolleys" operated by a hand wheel, the latter being located generally at the left hand side in the booth at the firing point. The "trolley" or carriage consists of a heavy steel spring clamp holding a cardboard target (about 9 inches square) at the top edge of the target, the carriage being supported by a No. 8 or 10-gauge wire stretched from the firing point to the butt, at a level of about 2 ft. above the line of fire. The supporting wires are attached to the wood-work at the firing point by means of eye-bolts, which also regulate the tension of the wires. The trolleys are operated back and forth by an endless braided cord passing around angles over pulleys screwed to the wood work of the booth, and around the hand wheel. A

steel plate with the lower part inclined away from the firing point 20 or 30 degrees is placed about 12 inches back of the targets to stop the bullets and prevent them from gouging out the wall or woodwork behind. By deflecting the plates as described, the spatter of the lead is directed downward, and thus prevents damage to the woodwork around the targets. A suitable background behind the targets may be provided by white or light gray paint, or by a suitable fabric.

If the spatter of the bullets mars the targets, a shield of 1-in. boards can be erected and maintained between the target and the steel plate.

The lighting may be accomplished by a line of gas jets or electric lights about 2 ft. in front of the targets and at the same distance either above or below them. At least two jets should be used to light each target, otherwise the flicker of the gas jets makes the light unsatisfactory. The reflectors should be of tin or other metal, polished or painted white. Glass is too fragile for this purpose. Heavy timbers or steel plates must be provided to protect the lights and piping from wild shots. A telescope

is mounted in each booth to enable the marksman to see the location of shots in the bull's-eye.

When floor space is limited the rifle ranges can sometimes be located over the revolver ranges, or the latter, if the range is in a cellar, may be depressed by constructing a pit of a suitable depth at the firing point. The booths for rifle shooting and the operation of the targets are practically the same as already described.

It is best to complete all the work at the target end of the range first. After the location of the targets is definitely fixed the position of the firing line can be determined by making the distance from the target to the firing point two inches in excess of 20 yd. or 50 yd. as the case may be. The slight excess distance is important to avoid any possibility of having scores disqualified in case the range should later be checked or verified and found "short." It is desirable whenever possible to have the ranges of standard length, especially if matches with other clubs are contemplated.

The table for cleaning arms, and for tools, oils, utensils, surplus ammunition, etc., should never be placed near the booths, but on the

opposite side of the room, to avoid congestion at the firing line.

The floor on which the contestants stand at the firing line must be firm and solid, so as not to vibrate or move when others walk about in close proximity. A concrete floor covered with a carpet or rug of firm texture is excellent.

The following simple rules should be printed and posted in conspicuous places in every shooting range or gallery :

RULES

Arms shall be unloaded until the contestant is at the firing point.

Loaded arms shall be handled with the muzzle pointing toward the targets.

Automatic arms shall be used only under the personal direction of the Shooting Master.

Contestants are requested to use the greatest care in handling arms at all times.

The authority of the Shooting Master in charge shall be absolute.

The rules of the United States Revolver Association shall govern all match shooting.

The above rules must be strictly observed and will be enforced.

The Walnut Hill Range of the Massachusetts Rifle Association is one of the best 50-yd. revolver ranges in the country. A well-equipped gallery that has recently been built is that of the Crescent Athletic Club, Brooklyn, N. Y.

HINTS TO BEGINNERS¹

Selection of Arms.—There is no single arm that can be used advantageously for all classes of shooting. It is therefore necessary in the first place to decide for what purpose the arm is to be used. A careful perusal of the text under “Arms” and “Ammunition,” will be of assistance in reaching a decision. The next step is the selection of the arm. As already stated, the cheap, unreliable, and unsafe arms are to be carefully avoided. It is preferable to buy a second-hand arm of a reputable manufacturer, if in good condition, than a new one of inferior make. Second-hand arms frequently have defects that cannot be detected by the novice, and, if obliged to buy a second-hand arm, it is advisable to ask some expert shot to assist in making the selection. The price of the best grades of pistols and revolvers is, fortunately, within the reach of almost every one, and, if at all possible, new arms should be purchased.

In any case, whether a new or a second-hand

¹ Under this subject the author aims to give helpful practical information and advice for the benefit of all who wish to acquire skill in pistol and revolver shooting.

arm is to be chosen, it is well to examine and handle all the different models of the best makers. The fit and feel of the arm are very important. Select an arm that feels comfortable, and which, when properly held, fits the hand so that the first joint of the trigger finger just touches the trigger when that part of the finger is bent at right angles to the barrel.

The correct manner of holding the pistol or revolver is here shown, and illustrates how the hand should fit the arm. Note particularly the position of the trigger finger and the thumb. The trigger finger in this position acts directly backward in pressing the trigger, and the thumb assists materially in steadying the piece. If the piece is too large for the hand, the trigger finger will be more or less extended, and will pull sideways to a greater or less degree, and thus increase the difficulty of fine shooting. The fit of the arm is much more important, and has a vastly greater effect upon the results than fine distinctions between the merits of the different arms. Any of those named are excellent and are capable of shooting much more accurately than they can possibly be held by the most expert shots. A man with a large hand will probably find the Remington pistol



FIG. 50. — Correct Manner of holding the Revolver.

or the Colt New Service revolver best suited for him; another with a hand of medium size will find the S. & W. pistol or the S. & W. Russian Model revolver most desirable; while another still, with a small hand, may prefer the Stevens pistol or the .38-cal. military revolver, either the S. & W. or the Colt.

If an arm is wanted for steady use, select the plain blued finish, and wood handles; elaborate engraving and gold, silver, copper, or nickel finished arms are handsome and pleasing, but, if much used, become burnt and discolored where the powder gases escape, and soon become unsightly. A blued finish is also to be preferred when shooting in the sunlight. Most arms as offered on the market have hard rubber handles. These become smooth and slippery when the hand perspires, and are not as desirable as wood handles. A few expert shots prefer pearl handles.

The trigger pull should have the smallest possible travel and be smooth and positive. The smaller the travel of the hammer, the quicker will be the discharge after pulling the trigger. If the trigger does not pull smooth and "sweet," or becomes "creepy" from wear, it should be corrected by a skilled gunsmith. While the rules allow a

trigger pull of 2 lb. for the pistol and $2\frac{1}{2}$ lb. for the target revolver, many expert shots prefer to have their arm pull from $\frac{1}{2}$ to 1 lb. more. The rules also allow $7\frac{1}{2}$ and 8 in. barrels for the revolver. Most of the experienced shots prefer to have their revolvers balance near the trigger, and are of the opinion that the extra length of barrel above $6\frac{1}{2}$ in. does not offset the disadvantage of poorer balance. In the pistol, however, the length of barrel is invariably 10 in. Accuracy is lost very rapidly as the distance between the sights is reduced below $7\frac{1}{2}$ in.

For target-shooting, the .22-cal. pistols will be found admirably suited for beginners. The charge being light, there is less liability to "flinch," a fault easily and almost invariably acquired when the novice begins shooting with a heavy charge. The practice in aiming and pulling the trigger with these arms is excellent training and a first-rate and valuable preliminary to the more difficult and practical work with the revolver.

The double-action feature in a revolver is of very little practical value. Owing to the varying amount of resistance to the trigger in operating the mechanism, the aim is disturbed more than if

the hammer is cocked with the thumb. Even in rapid-fire shooting better results are obtained with a double-action arm if used as a single action. It is also more difficult to make the trigger pull smooth and short in double-action mechanisms.

Manipulation.—Most of the accidents with firearms are caused by carelessness and ignorance in manipulating them. The revolver and pistol, being much smaller, are more dangerous to handle than the rifle or the shotgun. An experienced pistol shot can easily be singled out by the extreme care and unostentation with which he handles his arms.

On picking up an arm, or if one is handed to you, open the action at once and make sure it is not loaded. *Always* do this, even if it is your own arm and you are quite sure it was not loaded when you last put it away; some one, without any idea of the danger, may have loaded it in your absence. Cultivate and practise the habit of always holding the arm, whether loaded or unloaded, so that it points in a direction where it would do no harm if it were to go off unexpectedly. By observing these simple rules, serious accidents will be impossible. No one should be allowed to handle firearms in a shooting club or

participate in any of the public matches until these rules have been thoroughly mastered.

Position and Aiming. — If you know of a club or shooting organization to which one or more first-rate pistol and revolver shots belong, it is well to join it, if possible. Much more rapid progress can be made by observation and by following the suggestions of experienced shots than if one is obliged to solve the various problems without such assistance or advice. In order to familiarize yourself with your arm, it is well to practise aiming and pulling the trigger before any actual shooting is attempted. By inserting an empty shell for the hammer to strike upon, the piece may be aimed and “snapped” without injury. The position you adopt is very important. Stand firmly on both feet, with the body perfectly balanced and turned at such an angle as is most comfortable when the arm is extended toward the target in aiming. Let the left arm assume any position that may be comfortable and natural. Select a small black spot with an extensive white background to sight at. A small black paster on a window-pane, with the sky for a background, is excellent for this purpose. When the aiming is correct, that is, when the sights are properly

aligned, their position with reference to the spot or bull's-eye should be as shown in Fig. 51. The top of the front sight should just make contact with the lower edge of the bull's-eye corresponding to the position of VI o'clock. It has been found by experience that it is much less fatiguing to lower the arm, holding the piece, to the target than to raise it, fully extended, up to the target.

With the pistol or revolver in the right hand, cock the hammer with the thumb, making sure that the trigger finger is free from the trigger and resting against the forward inner surface of the trigger guard. In cocking the piece, have the barrel pointing upward. Then extend the arm upward and forward, so that when you assume your firing position the piece will point about twenty degrees above the bull's-eye. With your eyes fixed on the bull's-eye at VI o'clock, inhale enough air fully but comfortably to fill the lungs, and lower the piece gradually until the line of the sights comes a short distance below the bull's-eye. Now, holding your breath and steadying the piece as well as you possibly can, bring the line of the sights into the position shown in Fig. 51. At the same time gradually increase the pressure on the trigger directly backward, so that

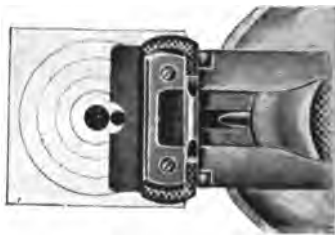


FIG. 51.—Correct position of the sights in aiming at the target.

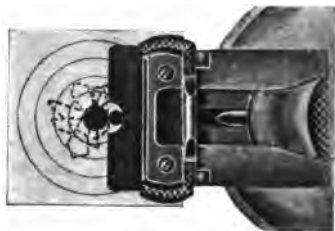


FIG. 52.—Showing the travel of the line of the sights about the bull's-eye in aiming.

when the sights are pointing at the bull's-eye the hammer will fall. Be careful not to pull the trigger with a jerk, but ease it off with a gentle squeeze, so as not to disturb the aim. Accustom yourself not to close the eye when the hammer falls, but note carefully where the line of the sights actually points at the instant that the hammer falls. You will, no doubt, find it almost impossible to pull the trigger at the moment the sights are just right. The hammer will fall when the line of the sights may point a little too high or too low, or to one side or the other of the bull's-eye; but patient practice will correct this, and in time you will be able to let off the arm at the right moment.

The pulling of the trigger is a very delicate operation; it is, in fact, the most important detail to master—the secret of pistol and revolver shooting. If the trigger is pulled suddenly, in the usual way, at the instant when the sights appear to be properly aligned, the aim is so seriously disturbed that a wild shot will result. To avoid this, the pressure on the trigger must always be steadily applied, and while the sights are in line with the bull's-eye. It is, of course, impossible to hold the arm absolutely still, and aim

steadily at one point while the pressure is being applied to the trigger; but, in aiming, the unsteadiness of the shooter will cause the line of the sights to point above the bull's-eye, then below it, to one side of it, and then to the other, back and forth and around it, as shown by the dotted lines in Fig. 52. Each time that the line of the sights passes over the bull's-eye the smallest possible increment of additional pressure is successively applied to the trigger until the piece is finally discharged at one of the moments that the sights are in correct alignment. Long and regular practice alone will secure the necessary training of the senses and muscles to act in sufficient harmony to enable one to pull the trigger in this way at the right moment for a long series of shots. A "fine sympathy" must be established between the hand, the eye, and the brain, rendering them capable of instant coöperation. The consciousness of the voluntary concurrence of the mind and the muscular system constitutes the real charm of pistol and revolver shooting.

After obtaining a fair idea of aiming, etc., watch carefully when the hammer falls, and note if it jars the piece and disturbs the aim. If not, you are holding the arm properly. If the aim is

disturbed, you must grip the arm tighter or more loosely, or move your hand up or down on the handle, or otherwise change your method of holding the piece until your "hold" is such that you can snap the hammer and the aim remain undisturbed. This aiming drill is largely practised by expert shots indoors, when they do not have the opportunity to practise regularly out of doors.

Target Practice.— If your first actual shooting is done at the range of a club, it is best to ask one of the members to coach you until you get accustomed to the rules, etc. A target will be assigned to you, and you will repair to the firing point and load your arm. It is well to let your coach fire the first shot or two, to see if your piece is sighted approximately right. If so, you are ready to begin shooting. If the sights appear to be as in Fig. 51 at the moment of discharge, then the bullet should hit the centre of the bull's-eye. If, after several shots, you are convinced that the bullet does not strike where it should, the arm is not properly sighted for you. In adjusting the sights, you will find it an advantage to remember a very simple rule: To correct the rear sight, move it in the same direction as you would the shots on the target to correct them; or

move the front sight in the opposite direction. Most target arms have the front sight non-adjustable, and the rear sight adjustable for both windage and elevation. A few arms have interchangeable or adjustable front sights for elevation. Move the sights a little at a time, according to the foregoing rules, until they are properly aligned. A few ten-shot scores should then be fired for record. As you become accustomed to the range, rules, etc., you will feel more at ease. This will inspire confidence, and your shooting will improve correspondingly. Do not have your sights too fine. Fine sights are much more straining on the eyes, and have no advantage over moderately coarse sights. The rear sights, as generally furnished, are purposely made with very small notches, so as to enable individuals to make them any desired size. It is well to have the trigger pull at least $\frac{1}{4}$ of a pound greater than the minimum allowed by the rules. If much used, the pull sometimes wears lighter; and if there is little or no margin, you run the risk of having your arm disqualified when you wish to enter an important match.

Never use other ammunition in your arm than that for which it is chambered. A number of

accidents and much difficulty have resulted from using wrong ammunition. In the same caliber the actual diameter of the bullets frequently varies considerably, and a few shots, even if they should not prove dangerous, may lead the barrel, and thus cause much delay and annoyance. When a barrel is "leaded" from any cause it will become inaccurate. In such cases, particles of lead usually adhere to the inside of the barrel at or near the breech. A brass wire brush, of suitable size to fit the barrel, will generally remove it. When this fails, carefully remove all oil, cork up the opposite end of the barrel and fill it with mercury, letting the latter remain in the barrel until the lead is removed.

Occasionally the powder is accidentally omitted in loading a cartridge. When the primer explodes, the bullet may be driven partly through the barrel and remain in it. When this happens, whether from this cause or any other, always be careful to push the bullet out of the barrel before firing another shot. If the bullet is not removed, and another shot is fired, the barrel will be bulged and ruined. This may occur with a light gallery charge.

When shooting the .22-cal. long rifle cartridge,

there will be an occasional misfire. In withdrawing the cartridge the bullet will stick in the barrel and the powder spill into the action. To prevent this, hold the barrel vertically, with the muzzle up, and withdraw the shell carefully. Then remove the bullet in the barrel with a cleaning rod; or extract the bullet from a new cartridge, inserting the shell filled with powder into the chamber back of the bullet and fire it in the usual manner. Do not use BB caps in any pistol that you value. They are loaded with fulminate of mercury and the bullets have no lubrication. These caps will ruin a barrel in a very short time. The .22-cal. conical ball caps contain powder, and the bullets are lubricated, making this a much better cartridge; but it is best to adhere to the regular .22 ammunition for which the arm is chambered.

Never under any circumstances shoot at objects on the heads or in the hands of persons. There is always a possibility of something going wrong, and such risk to human life is unjustifiable, no matter how skilful you may be.

Before competing in any match be sure to thoroughly familiarize yourself with all the conditions. This will prevent mistakes which fre-

quently disqualify competitors and lead to disagreeable controversies. Avoid getting into any arguments or disputes with range officers, or officials in charge of the matches, and particularly while the matches are in progress. The range officers are invariably extremely busy and it is unjust to the other competitors to usurp more of their time than is your proper portion. They are generally intelligent men who have been selected because of their fitness for the positions they hold, and their decisions and rulings should be accepted as final. If for good cause you should wish to protest against any decision or ruling of an officer in charge, do it in a quiet and gentlemanly way, and whether the rules require it or not, such protest should be made in writing.

The annual matches of the United States Army, the National Guard and Militia organizations are generally held at some selected state or government range, and at a certain specified time. All the contestants are, therefore, shooting on the same ground and under approximately the same conditions. All the revolver matches, except such as are conducted in the armories during cold weather, are shot in the

open; i. e. without shelter or protection from the wind. When shooting under these conditions in the glaring sunlight, it is a decided advantage to wear suitable, colored, large-lensed spectacles to temper the bright light and rest the eyes. The sights and top surface of the barrel should be smoked or blackened to prevent the reflection of light. This may be accomplished by burning a small piece of gum camphor, which makes an excellent smoke for this purpose, or by painting with "sight black." A wide rimmed hat will also add to the shooter's comfort in the bright sunlight. Nailed or rubber soles for the boots or shoes are to be preferred because they do not wear slippery.

In squadded competitions the weather conditions must be accepted as they are at the time of the shooting. In re-entry and individual matches the time of shooting is sometimes optional with the competitor. When this is the case it is a decided advantage to select a time when the conditions of light, wind, etc., are most favorable. On normal clear days, the early forenoon, or just before sunset, are generally the most favorable for suitable light. The wind generally slacks up to a certain degree

also just before sundown. Immediately after a shower the conditions are sometimes excellent. The position of the target with reference to the sun must also be taken into consideration. It is generally best to shoot directly toward or directly away from the sun. Rapid-fire shooting in a gusty wind is perhaps more difficult than under any other conditions. When the wind is steady one can brace up against it and do fair shooting, but when it is unsteady there will invariably be some wild shots. In deliberate untimed shooting one can wait for a lull and get the shots in during such brief intervals.

In practising rapid-fire shooting, great care is necessary in order to prevent accidents, especially in the case of the automatic pistols, which remain cocked and ready to pull the trigger after each shot. In shooting within a time limit, practise to use the entire period allowed and endeavor to do the best possible work, getting in the last shot just before the end of the period.

In training for matches be abstemious and maintain good physical condition. If your liver is torpid it must be stimulated. Do not tire yourself with too much practice shooting. One to two hours practice daily is ample.

It is also necessary to exercise extreme care in practising with the pocket revolver. Some persons delight in practising quick drawing from the pocket and firing one or more shots. This is dangerous work for the novice to attempt. Most of the pocket weapons are double action. If the finger gets into the trigger guard and the arm catches in the pocket when drawing, a premature discharge is likely to result, which is always unpleasant and sometimes disastrous. Practice in drawing the revolver from the pocket or holster should always be begun with the arm unloaded. Only after a fair degree of skill is acquired should actual shooting be attempted. For quick drawing from the pocket the only double-action revolvers that are fairly safe to handle are the S. & W. Safety Hammerless, and the Colt "Double Action," which has a safety notch for the hammer to rest on.

Drawing a revolver from a holster is easier and much less dangerous than drawing it from the pocket. Larger and more practical arms are generally carried in holsters, and such arms should be single action in all cases. In practising with a holster weapon, fasten the holster on the belt, and anchor the belt so that the holster will always be

at the same relative position. The holster should be cut out so that the forefinger can be placed on the trigger in drawing. Always carry a loaded arm with the hammer resting on an empty chamber or between two cartridges. In the woods, or in localities where such shooting would not be likely to do any harm, it is good practice to shoot at a block of wood drifting down in the current of a swift-flowing stream, at a block of wood or a tin can swinging like a pendulum, from horseback at stationary and moving objects, and from a moving boat at similar objects. Such practice is largely indulged in by cowboys, ranchmen, and others in the western part of the United States. Many of the published reports of wonderful shooting of this character are gross exaggerations. Such shooting is generally rapid-fire work with heavy charges at extremely short range, and while it is to be commended as being extremely practical, the actual performances do not compare favorably with similar work done by many amateur shots.

In shooting a long series of shots with black powder ammunition, when the rules allow it, the barrel should be cleaned and examined every six or ten shots, depending upon the clean-shooting

qualities of the ammunition used. It is well to examine the shells, also, and note if the primers have been struck in the centre. If not, then some of the mechanism is out of line, and the parts likely to have caused the trouble must be cleaned.

After securing good, reliable arms, stick to them. Much time and progress is frequently lost by buying and trying different arms, ammunition, etc. If, in any of your shooting, you should get results that are peculiar and unsatisfactory, make it your business to find out the cause of the difficulty, and remedy it as soon as possible. "Blazing away" a large quantity of ammunition carelessly and recklessly is absolutely valueless as practice, and is a waste of time. Give your whole attention to your work, and try your very best to place every shot in the centre of the bull's-eye. It is important to keep a full, detailed record of all your shooting, for comparison, study, etc. A suitable book should be provided for this purpose. Do not fall into the habit of preserving only a few of the best scores; but make it a rule to keep a record of *every shot*, and figure out the average of each day's work. The more painstaking and systematic you are, the more rapid will be your

progress. By careful, intelligent work, it is possible to become a fair shot in three or four months, and a first-rate shot in a year.

After a number of good shots have been developed in any club, there is generally a desire to measure skill with the members of another club. This leads to friendly matches, which are usually very enjoyable and instructive. Shooting in a match places a man under a certain strain which affects individuals quite differently; some become nervous and shoot poorly when the best work is expected of them, while others are braced up by the occasion and shoot brilliantly.

Cleaning and Care of Arms.—To maintain the highest efficiency in an arm, it is necessary to keep it in perfect order. The working parts must be kept clean and oiled, and the barrel should receive special attention and care. The residue of some powders is less injurious than that of others, but the arm should in all cases be cleaned and oiled immediately after it has been used. The cleaning should be very thorough. Heavy new cotton flannel is excellent for this purpose. It should be perfectly dry. Much of the fouling will rub off without moisture, but if moisture is necessary to soften the fouling in

places, use a thin oil. Never use water, ordinary kerosene, or similar fluids. For certain kinds of smokeless powders, cleaning fluids have been prepared that give good results. Be careful to use the special fluid that is adapted to the particular powder used, as the wrong fluid may do harm. For cleaning the inside of a barrel a wooden rod is best. It should have a knob on the end of such size that one or two thicknesses of the cotton flannel around it will fit the bore snug and tight. Square patches of suitable size may then be cut in quantities and used as required. Clean from the breech end of the barrel whenever possible. The slightest burr or injury at the muzzle will spoil the accuracy of an otherwise good barrel. Particular care should be exercised, especially if a steel rod with a slot is used, to prevent the wad from "jamming" in the barrel. Continue cleaning the inside of the barrel until tight-fitting patches, when withdrawn, show no discoloration, and the barrel is warm from the friction of the cleaning. Then saturate a fresh patch with good oil and pass it through the barrel several times, making sure that the entire surface of the grooves has been thoroughly coated with oil. After the cylinder and other parts are cleaned, they should

also be oiled. A good oil for cleaning is "Three in One"; for preventing rust, use refined sperm oil. Plenty of oil should be kept on the circle of teeth in which the pawl engages in revolving the cylinder. If smokeless ammunition is used, the oil should be removed from the interior of the barrel and the chambers of the cylinder, a day or two after the first cleaning, and fresh oil applied.

In warm weather, when the air is humid, arms rust very quickly. If they are not kept in an airtight compartment, they should be inspected, and, if necessary, oiled every few days. Under ordinary conditions, a thorough cleaning and oiling will preserve the arm in good condition for a month. If it is desired to store the arms, or protect them for long periods of time, the interior surfaces of the frame, and all the mechanism, should be carefully cleaned and oiled, and then the entire space within the frame filled solid with a non-liquid grease, like the Winchester "gun grease." After cleaning the barrel and cylinder, the bore and chambers in the cylinder should also be filled solid with the grease. This treatment excludes the air, and absolutely prevents oxidation. The exterior should be oiled, and then coated heavily with "gun grease." Place the arm

in a dry woollen cloth, or flannel cover, and wrap it up in a double thickness of new manila paper of the weight of ordinary writing paper. Repeat this, wrapping twice more, each wrapping independent of the other. Then lay the arm in a dry place, where the temperature will always be uniform, and not so warm as to melt the grease. An arm protected in this way will remain in good condition for a period of two years.

RELOADING AMMUNITION

The factory-loaded ammunition for pistols and revolvers is so excellent that little is to be gained by hand loading. It is sometimes desirable, however, to use special loads that are not furnished by the factories, and such ammunition must be loaded by hand. Then, too, many persons prefer to reload ammunition for economical reasons. In order to do this successfully, considerable experience and skill are necessary. The first attempts at reloading are invariably unsatisfactory and disappointing, and sometimes result disastrously. Extreme care and close attention to details are absolutely essential, especially if smokeless powders are used. It is much the safest and best plan for those who are unfamiliar with reloading

to observe and study the methods used by skilled persons, and, if possible, have their first work supervised by an experienced person.

Primers.—The primers are made of copper and brass and are adapted for either black or smokeless powders. The primers for pistol and revolver cartridges are made more sensitive than for rifle cartridges. If, by mistake, rifle-cartridge primers are used, there are likely to be many misfires. The original pasteboard boxes in which the cartridges or shells are purchased invariably have labels designating the kind of primer that should be used in reloading them. The quality of the primers affects the results to a much greater degree than most persons imagine, especially in reduced or gallery charges. In handling or in transportation the fulminate is sometimes loosened, dropping out of some of the primers and leaving them considerably weaker than the rest. On opening a new box, empty it carefully, and if any appreciable quantity of loose fulminate is found, the primers should not be used for ammunition intended for fine shooting.

Shells.—The shells are generally made of brass with a solid head containing a pocket for a primer. There is considerable variation in the thickness

of the metal from which shells are made by the various manufacturers. Since the outside dimensions must be the same in order to fit the chamber, it follows that the inside diameter of the shells will vary. When the shell is to be crimped a slight difference in the size is unimportant, but for fine target work using black powder, it is preferable not to crimp the shell. In the latter case the bullet must fit sufficiently tight so that it will not be dislodged by the recoil of the arm. The size of the bore, when adapted to the same cartridge, varies a trifle, also, with different manufacturers. With the slight difference in the size of the shells it is therefore generally possible to select a make of shell the size of which will be just right to hold snugly in position by friction a bullet that exactly fits the bore of the arm. These refinements in the fit of the bullet and shell are important in securing good results with reduced loads. In pistol and revolver shooting, the shells may be reloaded many times with smokeless powders. The small charge and the consequent reduced pressure do not seem to render the shells brittle and unsuitable for reloading, as is the case with the shells of many of the high-pressure rifle cartridges.

Bullets.— In the large ammunition factories

the bullets are made by the swaging process with heavy machinery. They are, in consequence, very uniform in density and size. They are packed in boxes of twenty-five and fifty and are lubricated ready for use. While very few persons are able to mould bullets as good as those factory-made, when bullets of a particular shape, weight, or temper are desired, they must be moulded. The Ideal Manufacturing Company's dipper and melting pot¹ are useful for this purpose. The best quality of lead in bars or pigs should be used. If the bullets are to be hardened, "block tin," which may be had at any hardware store, is alloyed with the lead. Weigh the proper quantity of each metal to give the desired proportions. Melt the lead in the pot over a steady fire and then add the tin.² After both are melted immerse the dipper and allow it to acquire the temperature of the melted lead. Then fill the dipper and, with the nozzle horizontal, raise it two or three inches above the surface of the lead in the pot.

¹ The Ideal Manufacturing Company of New Haven, Conn., publishes a handbook containing full information in regard to moulding bullets, reloading ammunition, tables, and other useful information relating to shooting.

² At this stage add a small quantity of tallow or beeswax to the molten metal (about the size of a .45-cal. round bullet) and stir briskly with the dipper. This will flux the mixture and make it flow better.

With the mould in the other hand, turn it side-wise and bring the pouring hole of the mould to the nozzle of the dipper. Then, with the mould and dipper in contact, tilt or turn both in this position until the dipper is over the mould and the nozzle vertical as shown.

The weight or pressure of the lead in the dipper is thus utilized to force the lead into and



FIG. 53. — Moulding Bullets.

completely fill the corners of the mould. It will be necessary to mould forty or fifty bullets before the mould acquires the proper temperature and casts first-class bullets. All imperfect bullets should be thrown back into the melting-pot. Experience has shown that the best results are obtained when the lead and mould are such a temperature that two or three seconds elapse before the lead solidi-

fies in the pouring hole after the pozzle has been removed from it. Do not allow the lead to get red-hot, as it oxidizes very rapidly and more dross forms on its surface at that temperature. The dross should be skimmed off and not allowed to collect in the dipper. A new mould will not cast perfect bullets until the surfaces in contact with the lead are free from oil and have become oxidized, assuming a deep blue color. Provide a soft surface for the bullets to fall upon after releasing them from the mould, as they are easily deformed while hot. The sliding top or "cut-off" should be operated by pressing down the lever end on a board or table, or striking the lever with a small wooden mallet. The mould is then opened, and the bullet drops out. If the bullet sticks in the mould, strike the empty half of the mould on the outside, directing the blow toward the bullet. This will jar the bullet out of the mould without difficulty. Never strike the mould with a hammer or any hard substance, and never attempt to pry a bullet out of the mould or touch the interior surface with anything that will mar it. The least indentation of the sharp edges of the mould will cause the bullets to stick and make them imperfect. After using, oil the interior and exterior

surfaces and joints while warm, wrap in a dry cloth, and keep in a dry place where it will not rust. The safest way is to fill the inside of the mould solid with "gun grease" after it has cooled.

The fit of the bullets is very important. Nearly all the bullets for revolver cartridges have been designed to be used with black powder. Many of them are slightly under size and have concave bases which upset sufficiently, on the ignition of the regulation powder charge, to fill the grooves of the barrel. Reduced charges of black powder, and smokeless powders, even in full charges, seldom upset the bases of these bullets, and the powder gas escapes around the sides of the bullet, which is known as "gas cutting." This is fatal to accuracy. For smokeless powders and reduced loads the concave cavity at the base of the bullet must be large enough to reduce the thickness of the outer rim of the bullet and weaken it so it will be expanded sufficiently by the powder to fill the grooves of the barrel; or the diameter of the bullet should be increased so as to produce the same effect. A simple test to determine the fit of the bullet is to force it into a clean barrel, and then hold the barrel in the

direction of a window or bright light. If light can be seen in any of the grooves around the bullet, it is too small for smokeless powder. The remedy is to have the bullet mould reamed out and enlarged so the bullets will be the proper size. To determine the actual diameter of the bore of a pistol or revolver, oil the inside of the barrel liberally and then force a bullet into it a couple of inches. With a short wooden cleaning rod, hold the bullet in that position while you drive against it with another rod from the opposite direction, swaging it so as to fill the barrel. This must be done gently and carefully so as not to strain or injure the barrel. The bullet is then driven out and carefully measured with a micrometer gauge. Many who mould their own bullets prefer to order the mould to cast the bullets the exact size to fit the barrel; while others prefer to have the mould cast the bullet one or two thousandths of an inch too large, and then pass them through a sizing tool, reducing them to the correct size. The latter method insures absolute uniformity. For smokeless powders the bullets are generally cast a little harder than for black powder, the proportions being from 30 to 1, to 20 to 1, of lead and tin respectively. To secure

good results, the bullets should not vary more than $\frac{1}{200}$ in weight.

The next operation after moulding the bullets is to lubricate them. A good lubricant may be prepared by melting together $1\frac{1}{2}$ lb. of Japan wax, 1 lb. of mutton tallow, and 1 lb. of vaseline. The bullets should be set in a shallow pan, bases down, and with a small space separating them. The lubricant can then be poured around them until it rises high enough to fill the top cannellure. After cooling, the bullets are cut out of the lubricant by forcing them into the mouth of a specially prepared shell with the top or head cut off. Each bullet is picked up in this way and then pushed out with a round stick. Any lubricant on the base of the bullet should be removed with a cloth before loading. An excellent machine for lubricating bullets is made by the Ideal Manufacturing Company. The machine sizes and lubricates the bullet at one operation. It is rapid, clean, and performs the work perfectly.

Powders.—American powder manufacturers have no uniform practice in regard to designating the different grades of powder, sizes of grains, etc. The powders that give the best results under certain conditions must therefore be classi-

fied. The following black powders are best suited for ammunition in which the charge is ten to twenty grains: —

American Powder Mills Rifle Cartridge No. 4.

Hazard Powder Company's "Kentucky Rifle F F G."

E. I. Dupont de Nemours & Company's "Dupont Rifle F F G."

Laflin & Rand Powder Company's "Orange Rifle Extra F F G."

King Powder Company's "Semi-smokeless F F G."

When the charge is less than ten grains in weight, one size finer grain of the above powders should be used; and for charges heavier than twenty grains, one size coarser grain will give the best results.

For reduced or gallery charges, the high-grade quick-burning shotgun powders are sometimes used, such as "Hazard's Electric," "Dupont's Diamond Grain," etc. These powders should not be used in full charges, and if compressed in the shell will give very irregular shooting.

Smokeless powder differs from black not only in composition, but also in the phenomena that attend combustion. Special conditions are there-

fore created which have an important bearing on the results. Smokeless powders are divided into two general classes, designated as "bulk" and "dense," the former having approximately the same strength as an equal bulk of black powder, while the same quantity by bulk of the latter may have from five to ten times the strength of black powder. The bulk powders may be used very much the same as black powder, except that they should never be compressed. No air space is required between the powder and the bullet. Dupont's Smokeless Rifle Powder No. 2 and Hazard's Smokeless Rifle Powder No. 2 are good examples of the bulk powders.

The dense powders, such as du Pont & Co.'s Bull's-eye, Walsrode, Ballastite, and others, on account of their concentrated form, must be manipulated with great care and precision. The same quantity by bulk as black powder of any of these would in many cases cause disaster. Special shells with an annular crease, which only admits the bullet a certain distance into the mouth of the shell, and providing an air space, must in all cases be used with these powders. Some varieties of smokeless powders, like Walsrode, require a certain amount of confinement in order to secure

complete combustion, and do not give good results unless the shell is crimped securely to the bullet. A table giving the proper charges is supplied by all the manufacturers of smokeless powders, suitable for revolver and pistol shooting. These charges should in no case be increased. If it is desired to adapt a smokeless charge to a special bullet, which gives good results with black powder, the approximate equivalent in smokeless can easily be calculated from the powder company's table of charges. If the calculated charge does not give good results, compare the penetration of the smokeless charge with the black powder charge, and modify the former until it gives approximately the same penetration as the latter. If this does not correct the difficulty, the fit of the bullet should be investigated, and possibly it may have to be increased in size slightly and hardened before the best results will be obtained.

No attempt should be made to secure higher velocities or greater penetration with the ordinary lead bullet than is obtained with black powder. Such results can only be produced with hard alloy or jacketed bullets, special rifling, etc., and in arms designed to withstand the severe conditions incident to such augmented effects. Exces-

sive charges in regulation arms, besides being extremely dangerous, are likely to cause the bullet to strip the rifling and lead the barrel.

Reloading.—Suitable tools for reloading are furnished by the Ideal Manufacturing Company, Smith & Wesson, and the Winchester Repeating Arms Company. These usually consist of one or more combination tools, with which the various operations of reloading may be performed with rapidity and precision. In reloading ammunition the one thing to be borne in mind above all else is *uniformity*. No matter how excellent may be the quality of the powder, or how perfect the bullets, if there is any variation in quantity, size, etc., the results will surely be irregular and disappointing. The bullets should be of the same diameter and weight, the mouth of the shells of uniform size, the powder accurately measured, and all the details in the operation of loading each shell should be as nearly identical as it is possible to make them.

Shells that have been loaded with black powder will corrode very rapidly if not properly and promptly cared for. The primer should be extracted from the shells as soon as practicable after firing. The shells should then be immersed in hot soap-suds and stirred around

briskly until thoroughly washed. If it is desired to brighten them or to remove corrosion, add one tablespoonful of sulphuric acid to each quart of suds. Rinse the shells in two clean boiling waters by agitating them as before, and then dry them by exposure to sunlight or mild heat. Intense heat will draw the temper of the shells and ruin them. If the shells were originally crimped they will have to be opened with the tool so as to admit the bullet without shaving off or abrading its surface. The Ideal Manufacturing Company can furnish a special plug, screwed to the tool, by which the primer may be extracted and the mouth of the shell opened. In one operation, the tool automatically releasing the shell from the plug, thus making the operation of opening the mouth of the shell rapid and easy. In the case of smokeless powders the cleaning of the shells is not so important, but is desirable, as some of the powders leave a sticky residue which interferes more or less with the reloading process.

After the shells have been cleaned and dried the new primers may be placed in position. In doing this be sure to seat them firmly on the bottom of the pocket and below the surface of

the head of the shell. This will prevent misfires and premature explosions.

The measuring of the powder charge is the most important detail in reloading ammunition. There are several devices to measure powder that are convenient and fairly accurate. Those furnished by the Ideal Manufacturing Company, designated as No. 5 or No. 6, and those made by H. M. Pope and D. W. King, Jr., are the best. The usual method is to measure the powder with a charge cup that is supplied with the reloading tools. A quantity of the powder should be poured from the can into a small box and the charge cup dipped into it and filled. With a thin lead-pencil tap the cup lightly two or three times on the side to settle the powder uniformly. If the powder settles below the top of the cup dip the cup into the powder again and fill it, being careful not to tilt the cup so as to disturb the powder already in it. Strike off the powder in the cup with the pencil and pour it into the shell. By measuring the powder in this way and verifying it by weighing each charge in a delicate balance, a high degree of skill may be acquired in a short time. Ordinary revolver charges should not vary more than one-tenth of

a grain in weight. The charge cup method is preferred by many in measuring smokeless powders, as some varieties, being coarse grained and light in weight, are liable to form large voids. Such voids are invariably corrected when the charge cup is tapped and the powder settles.

After the desired quantity of shells has been primed and charged with powder, the bullets, properly lubricated, are started into the shells by hand and then one by one the cartridges are placed in the reloading tool, which seats the bullet and crimps the shell.

In reduced charges when the bullet is seated below the mouth of the shell, the tool should be adjusted so as not to crimp the shell. The black powder gallery loads, as given under "Ammunition," are entirely satisfactory and are fairly accurate up to distances of twenty yards. Fired from a 6½-inch barrel they will generally shoot within a 1½-inch circle at that distance. In loading cartridges in which the shells are not crimped on the bullets, it is very important that both the shells and the bullets should be absolutely uniform in size, so that the fit of the bullets in the shell will be the same in all cases. By reloading some of the shells oftener than

others or with different charges, the expansion of the shells will vary and the bullets will fit more or less tightly. Such ammunition when fired will vary in elevation. It is well to begin with new shells using the same load in them and reloading them the same number of times. Even with the same charge and under apparently identical conditions a few of the shells will expand differently. This variation will however be readily discovered in seating the bullets with the tool. Cartridges in which the bullets seat with greater or less effort than the average should be carefully separated from the rest and not used when fine shooting is required.

In reloading ammunition with round bullets the neck of the bullet should be up, opposite the powder side. In this position the neck is always in sight, and any turning of the bullet so as to bring the neck on the side and in contact with the barrel will be apparent and can be corrected. All round bullets should be at least $1/1000$ of an inch larger in diameter than the bottom of the grooves of the barrel. This causes them to deform slightly on the circle of contact with the barrel, and creates a narrow cylindrical surface around the bullet, securing a

better bearing and greatly increasing the accuracy. It also insures the tight fitting of the bullet in the shell, preventing it from being displaced by the recoil. If round bullets fit loosely, or if there is the slightest imperfection in the bullet where it comes in contact with the shell or the barrel, "gas-cutting" will result and hot lubricant is liable to pass by the bullet into the powder charge. In either case the accuracy is impaired.

In reduced loads when black powder or "bulk" smokeless powder is used, the bullets may be seated so as to just touch the powder charge; never so as to compress it. When "dense" smokeless powder is used a suitable air space must always be provided. This is necessary both when round or conical bullets are used. With all forms of conical bullets, however, and when using either "dense" or "bulk" smokeless powder, in full or reduced charges, better results are generally obtained by seating the bullets in the regulation position and crimping the shells moderately and uniformly on the middle of the front band of the bullet.

When it is desired for any reason to seat the bullets below the mouth of the shell in ammu-

nition loaded with "dense" smokeless powder, the amount of the air space will affect the accuracy to an extraordinary degree. The position of the bullets in the shells as given in the following table will provide approximately the right air space and give good results:

Case or Shell.	Diam. of Bullet in Inches.	Bullet and Weight in Grains.	Brand of Smokeless Powder and Weight in Grains.	Top of Bullet Below Mouth of Shell.
.38 S. & W. Special.	.361	Round 72	du Pont & Co.'s Bull's-eye, 2.0..	$\frac{4}{16}$ in.
.44 S. & W. Russian	.431	" 121	" " 2.3..	$\frac{1}{16}$ in.
.44 S. & W. Russian	.430	Conical 160	" " 2.4..	$\frac{1}{8}$ in.
.44 S. & W. Russian	.430	Conical gal. 110	" " 2.3..	$\frac{1}{4}$ in.
.45 Colt.....	.456	Round 145.....	" " 2.5..	$\frac{3}{8}$ in.
.45 Colt.....	.456	Conical 144	du Pont & Co.'s Shot-gun, 8.0..	Flush

When round bullets are used, the lubricant must be applied after they have been seated. This can best be done with a small brush. The brush is dipped into melted lubricant and then passed around the bullet where it is in contact with the shell. Too much lubricant is undesirable. At least three-quarters of the surface of the bullet should project above the lubricant. By keeping the lubricant at a constant temperature, the quantity adhering to the brush will be approximately the same and the results uniform.

APPENDIX

ANNUAL CHAMPIONSHIP MATCHES OF THE UNITED STATES REVOLVER ASSOCIATION.

MATCH A—REVOLVER CHAMPIONSHIP.—Open to everybody; distance, 50 yards; 50 shots on the Standard American target, 8-inch bull's-eye, 10 ring 3.36 inches; arm, any revolver within the rules; ammunition, any; the score must be completed in one hour or less from the time of firing the first shot; entrance fee, \$3; no re-entries.

Prizes: *First*, the championship silver cup (value, \$200), to be held by the winner until the next annual competition; inscribed on the cup, in raised ornamental letters, is, "This Cup Represents the Revolver Championship of the United States of America"; the name of the winner, the year and the score are also engraved on the cup each year; to the winner is also awarded a gold medal (value, \$25), with the same inscription on the reverse side as appears on the cup.

Second, a gold and silver medal, with inscription on the reverse side.

Third, a silver medal, with inscription on the reverse side.

Fourth, a silver and bronze medal, with inscription on the reverse side.

Fifth, a bronze medal, with inscription on the reverse side.

A bronze honor medal of the same design is also awarded to every competitor, not a prize winner, making a score of 425 or better.

MATCH B—PISTOL CHAMPIONSHIP.—Open to everybody; distance, 50 yards; 50 shots on same target as Match A; arm, any pistol within the rules; ammunition, any; the score must be completed in one hour or less from the time of firing the first shot; entrance fee, \$3; no re-entries.

Prizes: *First*, the championship silver cup (value, \$175), to be held by the winner until the next annual competition; inscribed on the cup, in raised ornamental letters, is, "This Cup Represents the Pistol Championship of the United States of America"; the name of the winner, the year and the score are also engraved on the cup each year; to the winner is also awarded a gold medal (value, \$25), with the same inscription on the reverse side as appears on the cup.

Second, a silver and gold medal, with inscription on the reverse side.

Third, a silver medal, with inscription on the reverse side.

Fourth, a bronze and silver medal, with inscription on the reverse side.

Fifth, a bronze medal, with inscription on the reverse side.

A bronze honor medal of the same design is also awarded to every competitor, not a prize winner, making a score of 435 or better.

MATCH C—MILITARY CHAMPIONSHIP.—Open to everybody; distance, 50 yards; fifteen consecutive strings of 5 shots on the same target as Match A; each string must be shot within the time limit of 15 seconds, taking time from the command, Fire; misfires and shots lost on account of the arm becoming disabled while firing any string will be scored zero; if a shot is fired after the time limit has elapsed, the shot of highest count will be deducted from the score; no cleaning allowed; arm, any military revolver, or any military magazine pistol within the rules; ammunition, the full charge service cartridge, or equivalent factory loaded ammunition approved by the executive committee; the score must be completed on the same day; no sighting shots will be allowed after beginning the score; entrance fee, \$3; no re-entries.

PRIZES: *First*, the championship silver trophy (an elaborate silver bowl, value \$450), to be held by the winner until the next annual competition; the trophy bears the inscription, "The Military Revolver Championship of the United States of America"; the name of the winner, the year, and the score are also engraved on the trophy each year; to the winner is also awarded a gold medal (value, \$25), with the same inscription on the reverse side as appears on the trophy.

Second, a silver and gold medal, with inscription on the reverse side.

Third, a silver medal, with inscription on the reverse side.

Fourth, a bronze and silver medal, with inscription on the reverse side.

Fifth, a bronze medal, with inscription on the reverse side.

A bronze honor medal of the same design is also awarded to every competitor, not a prize winner, making a score of 500 or better.

In 1900 and 1901 the military target with a 4 x 5-inch elliptical bull's-eye was used. The bull's-eye counted 5 and the possible was 375. Since then the Standard American target with the 8-inch bull's-eye has been used. Prior to 1904, twenty-five shots were fired at each of three ranges—25, 50 and 75 yards. That year the other ranges were discontinued and the 75 shots have since been fired at 50 yards only.

MATCH D—MILITARY RECORD MATCH.—Open to everybody; distance, 50 yards; five consecutive strings of 5 shots under the same conditions as Match C; entrance fee, \$1; entries unlimited.

This match was instituted in 1902. Being a re-entry match it affords good practice under the same conditions as Match C.

Prizes: *First*, a gold trophy (a laurel wreath surrounding a scroll, mounted on an ebony shield; value, \$150); between the scroll and the wreath is a ribbon on which, in raised letters, is, "The United States Revolver Association"; at the top of the scroll is engraved, "Military Record Match." The name of the winner, the year, and the score for each year are engraved on the scroll below; this trophy is held by the winner until the next annual competition, and is to become the property of the competitor winning it three times.

Second, a silver medal, with inscription on the reverse side.

Third, a bronze medal, with inscription on the reverse side.

A bronze honor medal of the same design is also awarded to every competitor, not a prize winner, making a score of 175 or better.

INDOOR REVOLVER CHAMPIONSHIP.—Open to everybody; distance, 20 yards; light must be artificial; 50 shots on the Standard-American target, bull's-eye 2.72 inches and 10 ring 1.13 inches in diameter, respectively; arm, any revolver within the rules; ammunition, any smokeless gallery charge. The score must be completed in one hour or less from the time of firing the first shot. Entrance fee, \$3; no re-entries.

Prizes: *First*, a silver cup (value, \$40), bearing the names and scores of the winners, to be held until the next annual competition, the cup to become the property of the person winning it three times.

Second, a gold and silver medal, with inscription on the reverse side.

Third, a silver medal, with inscription on the reverse side.

Fourth, a silver and bronze medal, with inscription on the reverse side.

Fifth, a bronze medal, with inscription on the reverse side.

A bronze honor medal will also be awarded to any competitor, not a prize winner, making a score of 425 or better.

INDOOR PISTOL CHAMPIONSHIP.—Open to everybody; distance, 20 yards; light must be artificial; 50 shots on the Standard-American target; bull's-eye 2.72 inches and 10 ring 1.13 inches in diameter, respectively; arm, any pistol within the rules; ammunition, any smokeless gallery charge. Black powder may be used in 22 cal. arms. The score must be completed in one hour or less from the time of firing the first shot. Entrance fee, \$3; no re-entries.

Prizes: The same as in the Indoor Revolver Championship, except that honor medals are awarded for scores of 435 or better.

RULES AND REGULATIONS GOVERNING THE CHAMPIONSHIP MATCHES OF THE U. S. R. A.

1. *General Conditions.*—Competitors must make themselves acquainted with the rules and regulations of the Association, as the plea of ignorance will receive no consideration. The rulings and decisions of the executive committee are final in all cases. These rules are for general application, but will not apply in cases where the special conditions of any match conflict with them.

2. *Classification of Arms.*—(a) Any revolver. A revolver of any calibre. Maximum length of barrel including cylinder, 10 inches. Minimum trigger pull, $2\frac{1}{2}$ pounds. Sights may be adjustable but they must be strictly open, in front of the hammer and not over 10 inches apart.

(b) Any pistol. A pistol of any calibre. Maximum length of barrel, 10 inches. Minimum trigger pull, 2 pounds. Sights may be adjustable but they must be strictly open, in front of the hammer and not over 10 inches apart.

(c) Military revolver or pistol. A revolver, or a magazine pistol, that has been adopted by any civilized government for the armament of its army or navy. Maximum weight, $2\frac{1}{2}$ pounds. Maximum length of barrel, $7\frac{1}{2}$ inches. Minimum trigger pull, 4 pounds. Fixed open sights. Rear sights of magazine pistols may be adjustable for elevation only.

(d) Pocket revolver. A revolver having a maximum weight of 2 pounds. Maximum length of barrel, 4 inches. Minimum trigger pull, 4 pounds. Sights and model must be such as not to hinder quick drawing of the weapon from the pocket or holster.

3. *Loading, Firing, Timing and Cleaning.*—In all revolver and pistol matches the weapon must not be loaded until the competitor has taken his position at the firing point. The barrel must always be kept vertical or pointed towards the target. After a match or record score has been begun, in case of an accidental discharge or of defective ammunition, if the bullet comes out of the barrel it will be scored a shot. The timing in matches C and D will be as follows: The competitor standing at the firing point with the arm loaded, not cocked, and the barrel pointing downward in a direction not less than 45 degrees from the target, will signify to the scorer when he is ready to begin each string. The scorer, stop watch in hand, will then give the command, "Fire," and exactly fifteen seconds later announce, "Time." Misfires will not be scored except in matches C and D. Competitors may clean weapons in matches A and B, and in the Indoor Championships, but no time allowance will be made for time spent in this way. All competitors will be required to finish their scores within the time limits specified, except in cases of accident, when the time may be extended at the option of the executive committee. Blowing through the barrel, to moisten it, will be considered cleaning.

In revolver matches the arm must not be used as a single loader or loaded so as to use a limited number of chambers in the cylinder. The cylinder must be charged with the full number of rounds for which it is chambered, and these must be shot consecutively. If scores are shot in ten shot strings, the cylinder shall be charged first with six rounds and then with four rounds. If the cylinder only contains five chambers, then the ten shot strings may be shot in two strings of five each. In matches C and D, and in the indoor or gallery events, the arm shall in all cases be charged with five rounds.

4. *Position*.—The position shall be standing, free from any support, the pistol or revolver being held in one hand, with arm extended, so as to be free from the body.

5. *Arms*.—Any revolver or pistol which in the opinion of the executive committee complies with the conditions specified in the various matches will be allowed to compete in those events. Revolvers or magazine pistols that have been adopted by any government for the armament of its army or navy, or such as in the opinion of the executive committee are suitable for military service, will be allowed in matches C and D. Among the arms which may be used in these matches are the .38 calibre Smith & Wesson or Colt military; .44 Smith & Wesson, Russian model; .44 Colt New Service; .45 Smith & Wesson Scofield; .45 Smith & Wesson New Century; .45 Colt, and the following magazine or automatic pistols: Colt, Borchardt, Luger, Mannlicher, Mauser, Mors.

6. *Sights*.—In open sights, the notch of the rear sight must be as wide on top as at any part. Aperture or peep sights or any covered or shaded sights will not be allowed. The use of a notch for the front sight will not be permitted. Sights may be smoked or blackened if desired. Sights on military arms, if modified to suit individuals, must remain strictly open, strong and substantial, and suitable for military use.

7. *Trigger-Pull*.—The trigger-pull as specified in the various events shall be determined by a test weight equal to the minimum pull applied at a point three-eighths of an inch from the end of the trigger and at right angles to the pin through the trigger.

8. *Ammunition*.—In matches C and D, and in the medal competition, where full charge ammunition is required, it may be the product of any reputable manufacturer. It must in all cases be brought to the firing point in unbroken boxes, with the label of the manufacturer intact.

9. *Targets*. The 200-yard Standard American rifle target No. 1 (containing the 4 ring), with an eight-inch bull's-eye shall be used in all matches at 50 yards. The diameters of the rings are as follows: 10 ring equals 3.36 inches; 9 ring equals 5.54 inches; 8 ring equals 8 inches; 7 ring equals 11 inches; 6 ring equals 14.8 inches; 5 ring equals 19.68 inches; 4 ring equals 26 inches; rest of target 28 inches by 28 inches counts 3. The same target reduced so that the bull's-eye or 8 ring is 2.72 inches in diameter and the 10 ring 1.13 inches in diameter, shall be used for all matches at 20 yards.

10. *Marking and Scoring.*—In all matches new paper targets shall be furnished for each competitor. Not more than ten shots are to be fired on any target at 50 yards, and not more than five shots on any target in matches C and D and for all shooting at 20 yards; the shot holes in all cases to remain uncovered and left as shot. Bullets touching, striking, or within a line on the target are to be scored the count of that line. The eye alone shall determine whether a bullet touches a line or not.

11. *Ties.*—Ties shall be decided as follows: (1) By the score at the longest distance; (2) by the score at the next longest distance; (3) by the fewest number of shots of lowest count; (4) by firing five shots each under the same conditions as the match and these rules in regard to ties, until decided.

12. *Supervision.*—The shooting in all the U. S. R. A. events must take place in the presence of at least two witnesses, one of whom must be an authorized officer of the local club, or shooting organization, or a governor appointed by the U. S. R. A. This officer shall certify that each contestant has complied with all the U. S. R. A. regulations as to distance, weapon, time, ammunition, etc., noting same on the blank spaces provided on the score cards and signing the score cards in duplicate for each contestant.

13. *Protests.*—Any person who believes that an injustice has been done, or who dissents from the decision of any authorized executive officer of the association, may enter a protest on depositing \$1 with the cashier or acting treasurer of the club or organization under whose auspices the matches are held. Such protest must be in writing, in duplicate, and must be made within 24 hours after the incident on which it is based. One copy to be handed to the executive officer of the club or organization conducting the matches and the other copy to be mailed to the secretary-treasurer of the U. S. R. A. All protests will be investigated and passed upon by the executive committee, and, if sustained, the protest fee will be returned; otherwise it will be forfeited.

14. *Records.*—The shooting for records shall, when practicable, be done on the grounds or in a gallery of a regularly organized shooting association, military organization or club, and in the presence of at least two witnesses, one of whom shall be an officer of the U. S. R. A., of such shooting organization or club. The foregoing rules and regulations and the conditions governing the championship matches of the U. S. R. A. must in all cases be observed and followed. The record score shall begin with the first shot after the shooter has announced his intention to shoot for record; only the first ten shots will apply to the ten shot record; the first twenty shots to the twenty shot record, and so on to 50 or 100 shots, as the shooter may desire. Such scores for record must in all cases be completed within the same proportional time limit as is specified for the corresponding championship match. After finishing the record score, the target shall be identified and signed by the witnesses as above designated. The witnesses shall also prepare and sign a certificate of prescribed form, which, with the detailed score

and all targets, shall be forwarded to the U. S. R. A., addressed to the secretary-treasurer. If all the conditions, rules and regulations have been complied with, the scoring correct, and if the score is higher than or equal to any previously made under the same conditions, it will be declared a new record. The score will then be entered as such in the record book of the association, and the shooter formally notified to that effect.

METHODS AND CUSTOMS TO BE FOLLOWED IN CONDUCTING THE ANNUAL COMPETITIONS OF THE U. S. R. A.

The conditions under which local clubs may be authorized to conduct the Championship Matches of the U. S. R. A. are as follows:

There must be not less than six members of the Association residing within twenty-five miles of the proposed place of holding the contest and there must be not less than three entries in one of the Championship matches.

The U. S. R. A. will furnish certified targets, score cards, and the prizes for the Championship events; the club or organization to furnish the shooting facilities free of expense to the Association and turn over to the secretary-treasurer all the entrance fees for the U. S. R. A. events. This plan has in all cases given satisfactory results, because the practice shooting of the contestants in the local re-entry matches usually affords sufficient revenue to pay the expenses of the tournament.

When a competitor signifies his intention to shoot in any of the events after paying the entrance fee, a regular ticket or duplicate score card (furnished by the United States Revolver Association) is filled out and issued to him, which is his receipt for the entrance fee. His score need not necessarily be shot immediately after issuing the ticket. The ticket, however, gives him his right of priority in case he wishes to shoot at a certain time and there are other competitors who wish to shoot also at that time. Tickets not used are forfeited.

The requisite number of targets will also be issued simultaneously with the score card. These must be numbered consecutively, they must have the competitors name and number of his score card written on them for identification, and must be shot in their numerical order. The targets are usually tacked at the corners on alternating frames covered with canvas with heavy paper pasted over it. Each target is left in position until the required number of shots have been fired at it, each shot being spotted and marked as fired [no pasters to be used]. When a string has been finished the target is lowered and the alternating target raised in position.

After the score is completed the targets are brought to the firing point and delivered to the range officer.

When a competitor wishes to shoot his score, his arm must be inspected and passed by the officer in charge, who must see that it conforms with the rules and requirements of the event in which it is entered. Competitors who wish to enter in any of the events should be urged to have their arms examined by the executive officer or committee in charge of the matches as soon as possible, so that in case there should be any exceptions made to the sights, the trigger-pull, or any other details, there will be an opportunity to have these exceptions corrected so as to comply with the requirements when the official test and inspection is made before shooting the score.

In matches C and D the scorer should have a reliable stop watch, so that the timing will be accurate. It is well, whenever possible, to have two men time the competitor, so as to have an additional check. A new target must be furnished for each string of five shots at each range. According to the rules, if a competitor starts to shoot a string at any range and his arm becomes disabled from any cause, those shots which reach the target within fifteen seconds after the command "Fire," will be counted as the complete score for the five shots. In the case of a disabled arm, the officer or committee in charge may allow the competitor to complete the remaining strings of his score with another arm. Shots on the paper target outside of the 4 ring count 3; shots missing the paper target count zero. After completing the score, when the duplicate score cards are filled out, the contestant takes the duplicate and the range officer retains the original for record.

All original score cards and all the targets shot in the various events are to be carefully preserved and promptly at the close of the contest forwarded, carriage prepaid, to the United States Revolver Association, addressed to the secretary-treasurer.

All unused targets and score cards are to be similarly forwarded to the secretary-treasurer with a complete detailed account of entrance fees, supplies, etc.

In the Medal Competition only those targets that actually count for medals are to be witnessed, certified and forwarded to the secretary-treasurer for verification and record.

In order that the conditions may be uniform and eliminate as much as possible the special conditions in regard to wind, etc., that may exist at the different places where the matches may be held, the shooters should be protected at the firing point by a shelter. This may be either the regular shooting house of the club, or, if the shooting is done in the open, by a suitable tent or temporary frame structure having an opening in the direction of the target; the other three sides being inclosed. The building or tent should be large enough to accommodate also the officer or committee in charge of the match, so that the shooter may be at all times in sight of the officer in charge of the range at the time the score is

made. A table of suitable size should be provided near the firing point for holding ammunition and for the convenience of the competitor to clean his arm in those events where cleaning is allowed. The firing point should be plainly marked and so located as to be at least two feet from any timbers, guards, ropes, tables, etc.

INSTRUCTIONS TO RANGE OFFICERS IN CHARGE OF THE CHAMPIONSHIP CONTESTS OF THE U. S. R. A.

Certified targets, score cards and reading matter will be furnished by this Association. A governor or other officer of the U. S. R. A. or local club, shooting or military organization, will be appointed in each locality where the matches are to be held to act as range officer, represent the Association, and have charge of the contests. This governor or officer shall *personally measure the range to verify the distance* and see that all the conditions of the matches are strictly complied with. He will also see that at least one other person is present to witness all the shooting and he shall certify to the correctness of each score and the conditions, by signing the score card when the score is completed, and all the targets of each competitor. The other duties in detail of the governor or officer in charge of the matches are as follows: When a competitor expresses his intention of entering a match, a score card is made out in his name and delivered to him on the payment of the entrance fee. These score cards are to be issued in numerical order, and when more than one contestant wishes to shoot at the same time, the man holding the first score card is entitled to the preference of position and time. When the contestant is ready to shoot, he hands his score card to the governor or other officer of the Association who thereupon issues the required targets numbered consecutively, with the name of the competitor and the number of his score card written on each target. The arm of the competitor is then inspected to make sure that it complies with the rules and regulations as given in the U. S. R. A. booklet. The sights must be carefully inspected and the trigger pull tested by weighing in *just before the score is begun*. The records for which blanks are provided on the score card with reference to the arm, ammunition, etc., are then filled in and the first target placed in position. As soon as the contestant begins his score, the time is taken from the firing of the first shot in matches A and B and in the Indoor Championships, and the entire score must be completed within one hour from this time. In matches C and D the time is taken from the command "Fire," and the five shots must be fired within 15 seconds. The announcing of intermediate times or seconds is not

allowed. Ten shots are to be fired at each target in matches A and B, and five shots at each target in matches C and D and in the Indoor Championships. After the score is completed, the separate targets are scored and the value of the shots filled in the score card, making corrections from the targets, if mistakes have been made by the markers, in the order that the targets are shot. After filling in and signing the score cards, the duplicate is handed to the competitor and the original preserved for record. The targets are then signed by the governor and preserved until the expiration of the period during which the matches are held, when all targets, original score cards and other supplies are to be sent to the United States Revolver Association, addressed to the Secretary-Treasurer. It is recommended that all scores after being shot, verified, etc., be wrapped in paper in separate packages, marked with the competitor's name, and that no one be permitted to handle and examine these targets after they have been scored and certified to.

For information relative to state championships, U. S. R. A. medal competitions, etc., address the Secretary-Treasurer.

RECORDS

The following records have been made under the United States Revolver Association rules since their adoption:

REVOLVER, 50 YARDS

50 shots:

April 26, 1903, J. E. Gorman, San Francisco, Cal.	
	94-91-88-90-95..... 458
Sept. 7, 1904, Dr. I. R. Calkins, Springfield, Mass.	
	8 8 8 9 9 10 10 10 10 10-92
	9 9 9 9 10 10 10 10 10 10-96
	8 9 9 10 10 10 10 10 10 10-96
	6 8 9 9 9 9 10 10 10 10-91
	7 8 8 9 9 9 10 10 10 10-90..... 465

30 shots:

April 26, 1903, J. E. Gorman, San Francisco, Cal.	
	94-91-88..... 273
Sept. 7, 1904, Dr. I. R. Calkins, Springfield, Mass.	
	92-96-96..... 284

20 shots:

April 26, 1903, J. E. Gorman, San Francisco, Cal.	
	94-91..... 185
Sept. 7, 1904, Dr. I. R. Calkins, Springfield, Mass.	
	92-96..... 188

10 shots:

J. E. Gorman, San Francisco, Cal., April 26, 1903.....	94
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MILITARY REVOLVER, RAPID FIRE, 50 YARDS

75 shots; in strings of 5 shots in 15 seconds:	
Sept. 16, 1904, Thomas Anderton, Creedmoor, N. Y.....	585
25 shots; in strings of 5 shots in 15 seconds:	
Sept., 1902, Thomas Anderton, Sea Girt, N. J.....	206

REVOLVER, 20 YARDS

50 shots:	
March, 1902, W. E. Petty, New York, N. Y.	
	89-88-94-82-86..... 439
June 11, 1903, Dr. W. H. Luckett, New York, N. Y.	
	91-93-91-93-96..... 464
March 4, 1904, Sidney E. Sears, St. Louis, Mo.	
	95-96-96-95-96..... 478
30 shots:	
March, 1902, W. E. Petty, New York, N. Y.	
	89-88-94..... 271
June 11, 1903, Dr. W. H. Luckett, New York, N. Y.	
	91-93-91..... 275
March 4, 1904, Sidney E. Sears, St. Louis, Mo.	
	95-96-96..... 287
20 shots:	
March, 1902, W. E. Petty, New York, N. Y.	89-88..... 177
March, 1903, Dr. W. H. Luckett, New York, N. Y.	93-85.... 178
June 11, 1903, Dr. W. H. Luckett, New York, N. Y.	91-93.... 184
March 4, 1904, Sidney E. Sears, St. Louis, Mo.	95-96..... 191
10 shots:	
March, 1902, Dr. W. H. Luckett, New York, N. Y.....	93
March 4, 1904, Sidney E. Sears, St. Louis, Mo.....	96
June 11, 1904, J. B. Crabtree, Springfield, Mass.....	98
Nov. 15, 1907, C. C. Crossman, St. Louis, Mo.....	100

PISTOL, 50 YARDS

50 shots:	
April 4, 1903, Thomas Anderton, Walnut Hill, Mass.	
	10 10 10 9 10 10 10 10 10 10-99
	9 9 10 10 10 9 10 9 9 9-94
	9 10 10 9 9 9 10 10 10 10-96
	10 10 10 10 10 10 10 10 10 9-99
	8 9 9 8 10 9 10 10 9 10-92..... 480
30 shots:	
E. E. Patridge, Walnut Hill, Mass., March 21, 1903.	
	96-96-95 287
Thomas Anderton, Walnut Hill, Mass., April 4, 1903.	
	99-94-96..... 289

20 shots:

E. E. Patridge, Walnut Hill, March 21, 1903. 96—96.....	192
Thomas Anderton, Walnut Hill, Mass., April 4, 1903. 99—94..	193

10 shots:

Eugene E. Patridge, Walnut Hill, Mass., March 21, 1903.....	96
Thomas Anderton, Walnut Hill, Mass., April 4, 1903.....	99

PISTOL, 20 YARDS

50 shots:

March, 1902, Lieut. R. H. Sayre, New York, N. Y.	
88—85—87—93—95.....	448
March, 1903, Thomas Anderton, Boston, Mass.	
92—97—87—93—91.....	460

30 shots:

March, 1902, Lieut. R. H. Sayre, New York, N. Y.	
88—85—87.....	260
March, 1903, Thomas Anderton, Boston, Mass.	
92—97—87.....	276

20 shots:

March, 1902, Lieut. R. H. Sayre, New York, N. Y. 88—85.....	173
March, 1903, Thomas Anderton, Boston, Mass. 92—97.....	189

10 shots:

March, 1903, Thomas Anderton, Boston, Mass.....	92
March 24, 1906, John A. Dietz, New York, N. Y.....	93
May 5, 1906, J. B. Crabtree, Springfield, Mass.....	95

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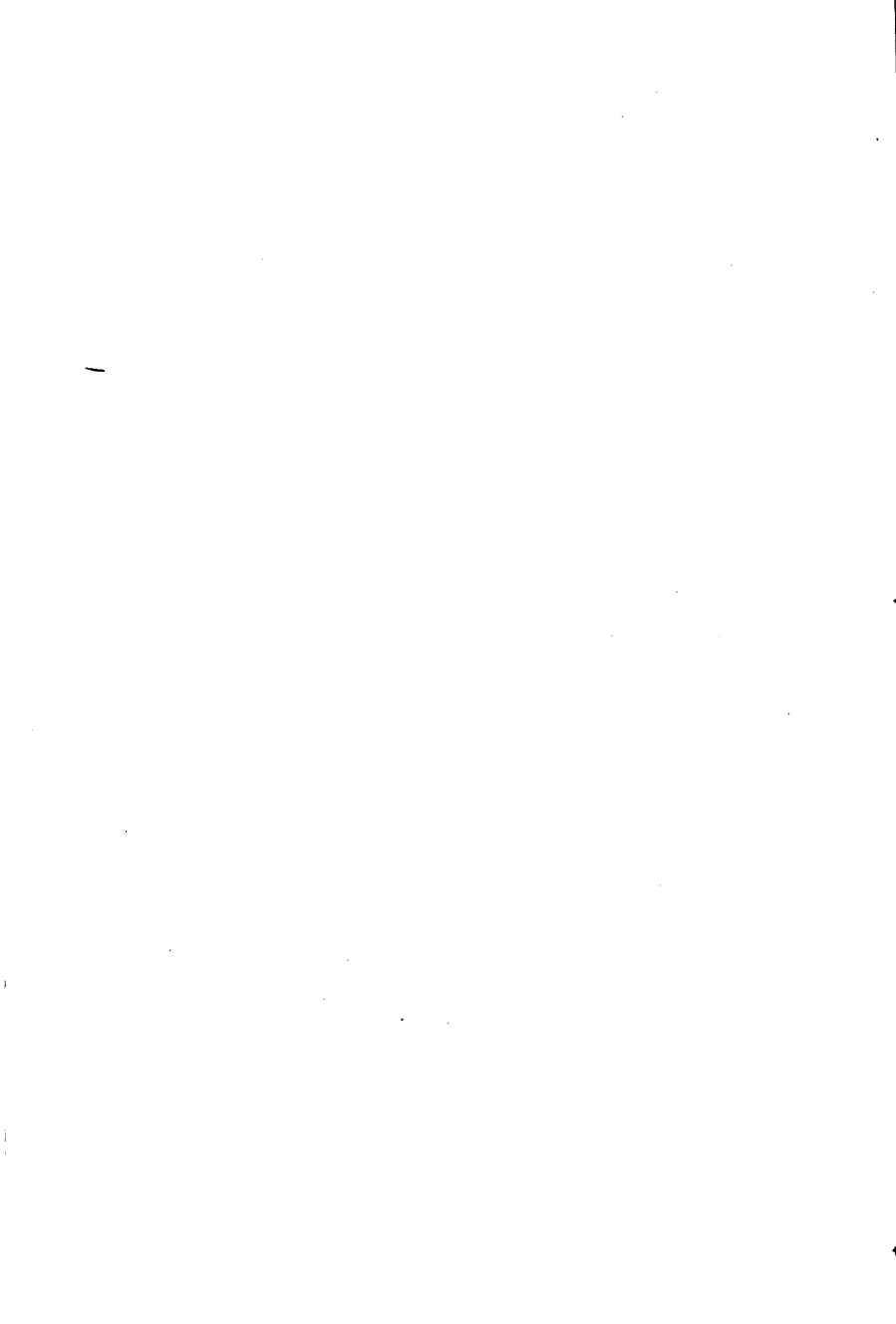
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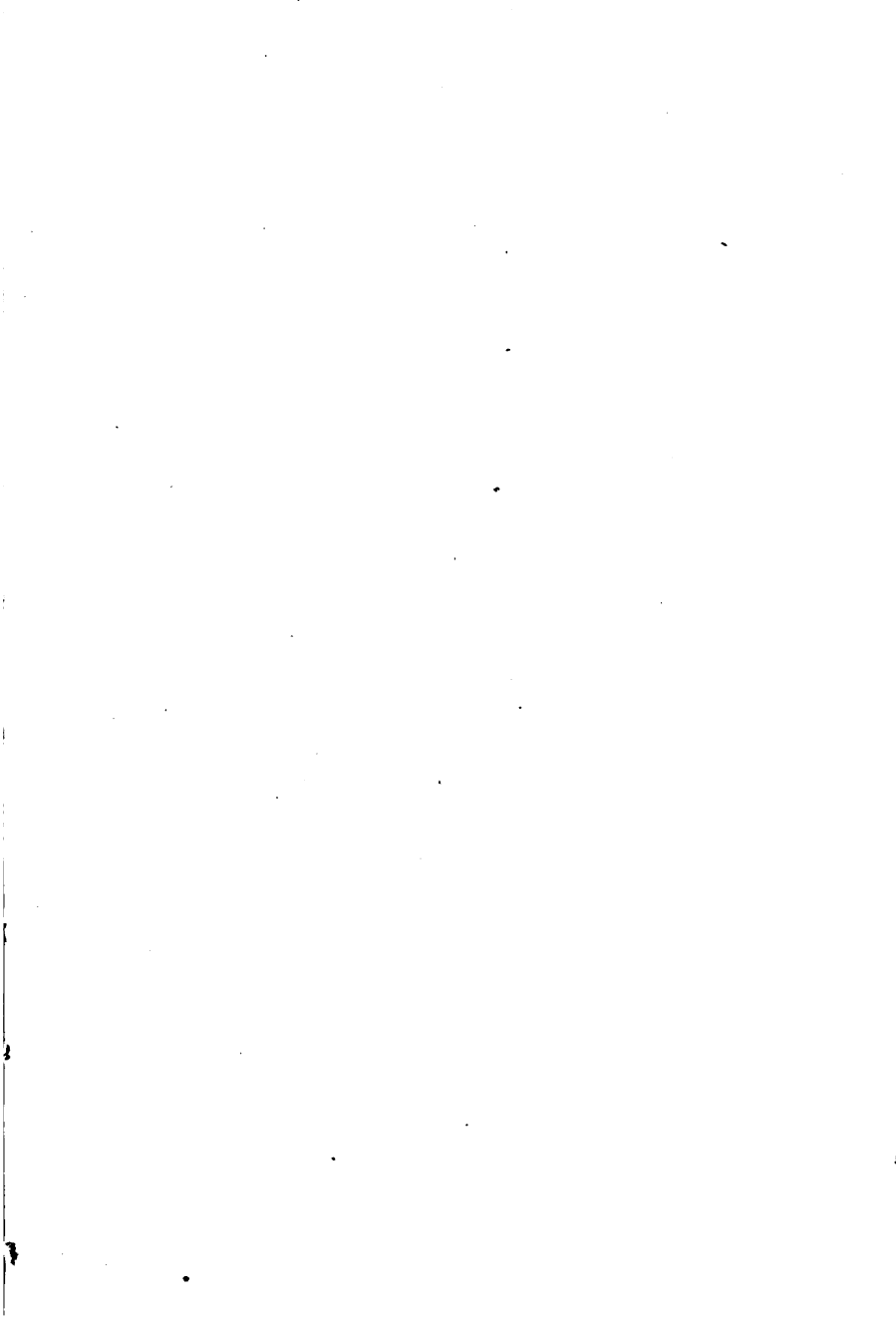
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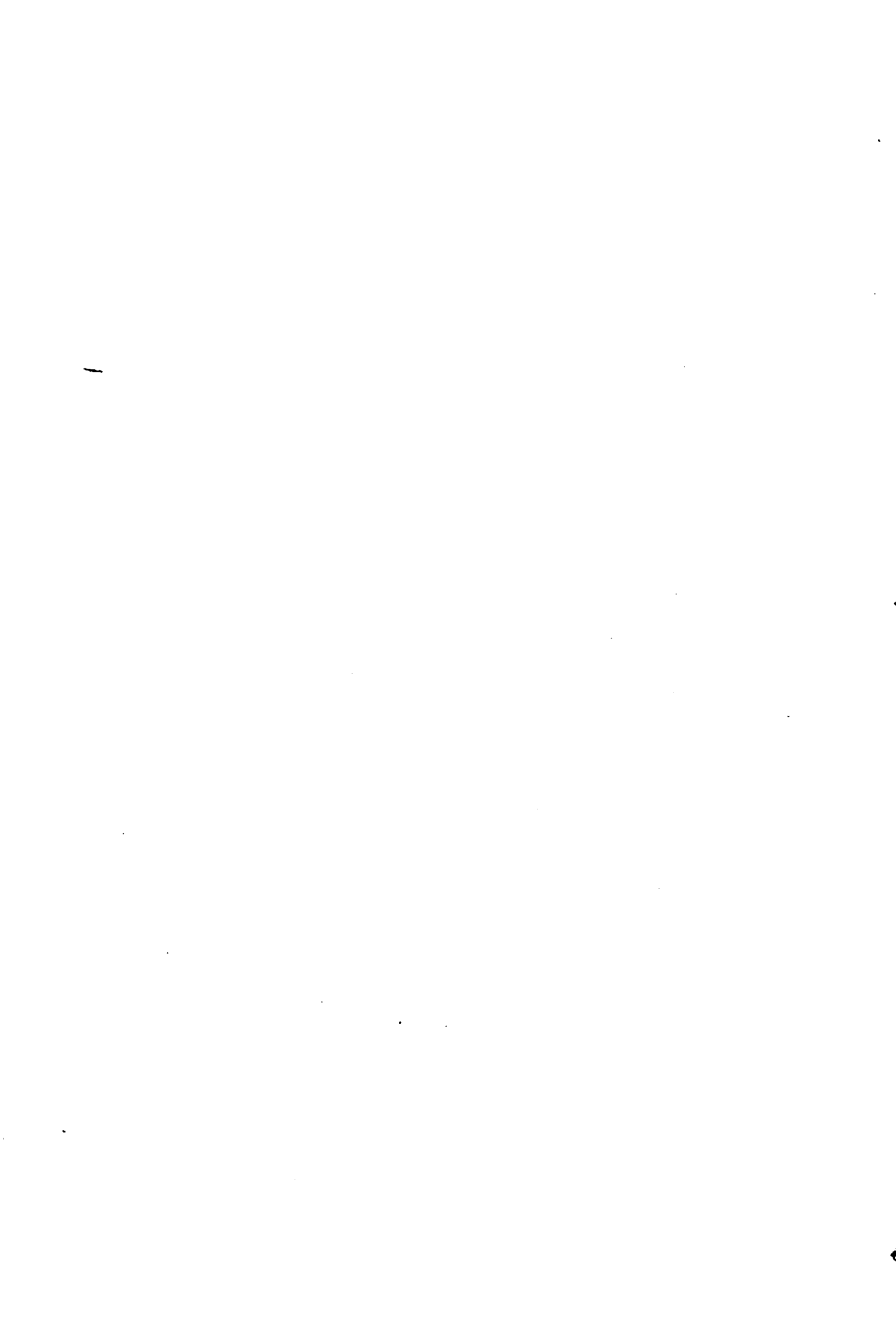
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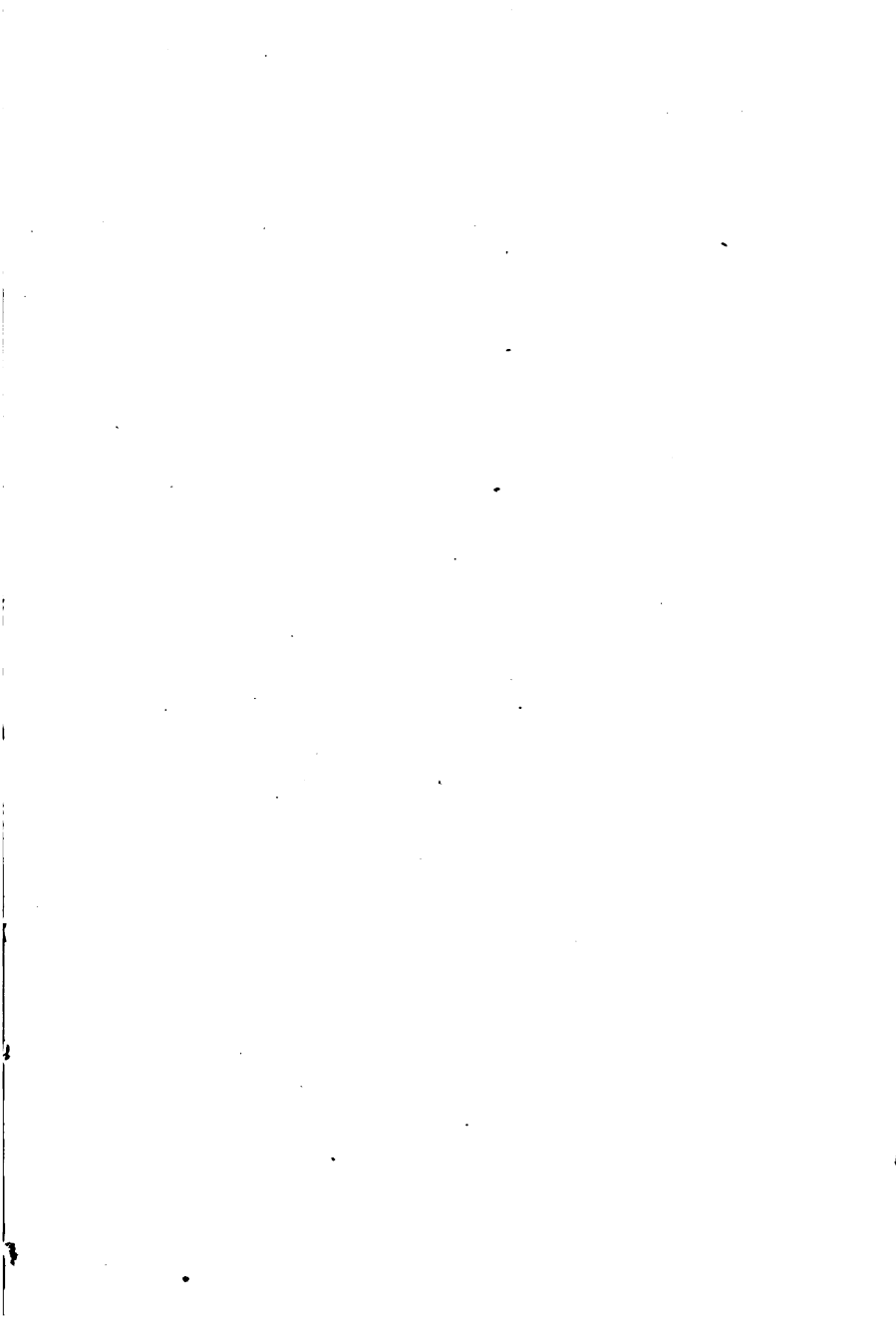
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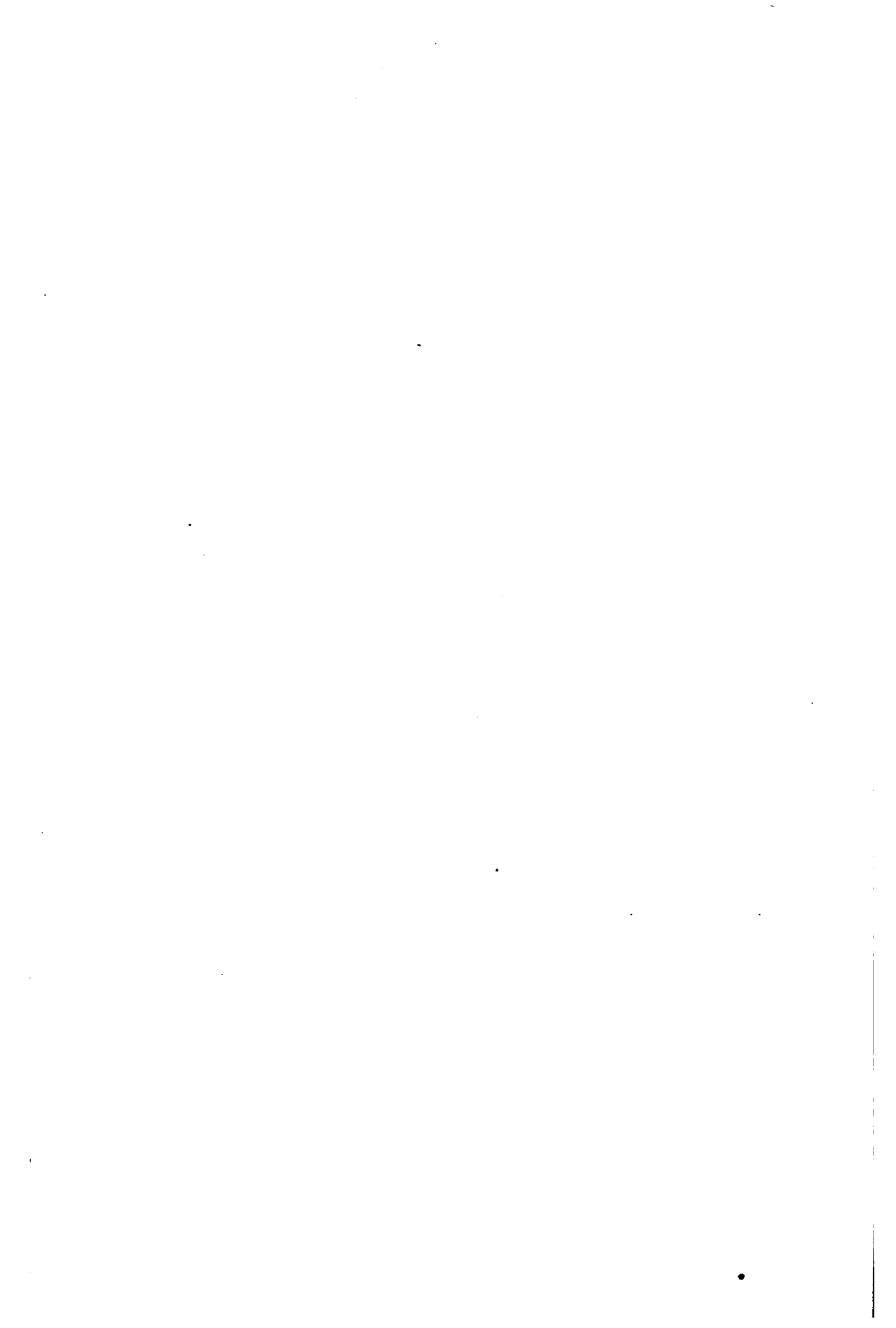
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